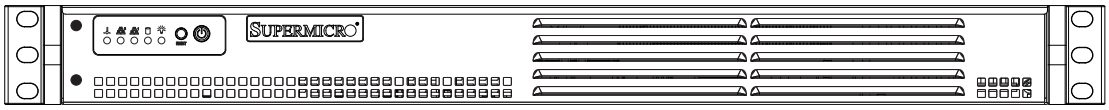
SUPERMICRO®

# SUPERSERVER 5015A-PHF



# USER'S MANUAL

Revision 1.0

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Manual Revision 1.0
Release Date: January 18, 2010

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# Preface

## About This Manual

This manual is written for professional system integrators and PC technicians. It provides information for the installation and use of the SuperServer 5015A-PHF. Installation and maintainance should be performed by experienced technicians only.

The SuperServer 5015A-PHF is a single processor 1U mini rackmount server based on the SC502L-200B server chassis and the Intel® Atom™ X7SPA-HF motherboard.

## Manual Organization

**Chapter 1: Introduction**

The first chapter provides a checklist of the main components included with the server system and describes the main features of the Super X7SPA-HF motherboard and the SC502L-200B chassis.

**Chapter 2: Server Installation**

This chapter describes the steps necessary to install the SuperServer 5015A-PHF into a rack and check out the server configuration prior to powering up the system. If your server was ordered without the processor and memory components, this chapter will refer you to the appropriate sections of the manual for their installation.

**Chapter 3: System Interface**

Refer to this chapter for details on the system interface, which includes the functions and information provided by the control panel on the chassis as well as other LEDs located throughout the system.

**Chapter 4: System Safety**

You should thoroughly familiarize yourself with this chapter for a general overview of safety precautions that should be followed when installing and servicing the SuperServer 5015A-PHF.

**Chapter 5: Advanced Motherboard Setup**

Chapter 5 provides detailed information on the X7SPA-HF motherboard, including the locations and functions of connectors, headers and jumpers. Refer to this chapter when adding or removing processors or main memory and when reconfiguring the motherboard.

**Chapter 6: Advanced Chassis Setup**

Refer to Chapter 6 for detailed information on the SC502L-200B 1U rackmount server chassis. You should follow the procedures given in this chapter when installing, removing or reconfiguring drives and when replacing system power supply units and cooling fans.

**Chapter 7: BIOS**

The BIOS chapter includes an introduction to BIOS and provides detailed information on running the CMOS Setup Utility.

**Appendix A: POST Error Beep Codes**

**Appendix B: System Specifications**

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***Appendix A POST Error Beep Codes***

***Appendix B System Specifications***

# Notes

# Chapter 1

# Introduction

## 1-1 Overview

The Supermicro SuperServer 5015A-PHF is a single processor, 1U rackmount server. The 5015A-PHF is comprised of two main subsystems: the SC502L-200B chassis and the X7SPA-HF motherboard. Please refer to our web site for information on operating systems that have been certified for use with the 5015A-PHF.

In addition to the mainboard and chassis, various hardware components may have been included with the 5015A-PHF, as listed below.

- One single 2.5" fixed HDD bracket (MCP-220-00051-0N)
- One dual 2.5" fixed HDD bracket (MCP-220-00044-0N)
- One SATA cable (CBL-0061L)
- One CD containing drivers and utilities
- SuperServer 5015A-PHF User's Manual
- Optional: One dual 2.5" fixed HDD bracket (MCP-220-00044-0N)

## 1-2 Motherboard Features

At the heart of the SuperServer 5015A-PHF lies the X7SPA-HF, a single processor, low-power motherboard based upon Intel's 945GC chipset. Below are the main features of the X7SPA-HF.

### Processor

The X7SLA-H supports one Intel® Atom™ D510 Dual-core 1.6 GHz processor. The processor is embedded into the motherboard.

### Memory

The X7SPA-HF has two DIMM slots that can support up to 4 GB of non-ECC DDR2-667 SDRAM.

### Onboard SATA

A SATA controller is built in to the ICH9R portion of the chipset to provide support for a six port, 3 Gb/sec Serial ATA subsystem.

### PCI Expansion Slots

The X7SPA-HF has one PCI-Express x4 slot (in a x16 slot).

### Onboard Controllers/Ports

An onboard IDE controller supports two IDE devices. Onboard I/O backpanel ports include one COM port, a VGA port, PS/2 mouse and keyboard ports, two Gb LAN ports and two USB ports. In addition, an extra COM port and USB ports are included on the motherboard.

### Other Features

Other onboard features that promote system health include voltage monitors, a chassis intrusion header, auto-switching voltage regulators, chassis and CPU overheat sensors, virus protection and BIOS rescue.

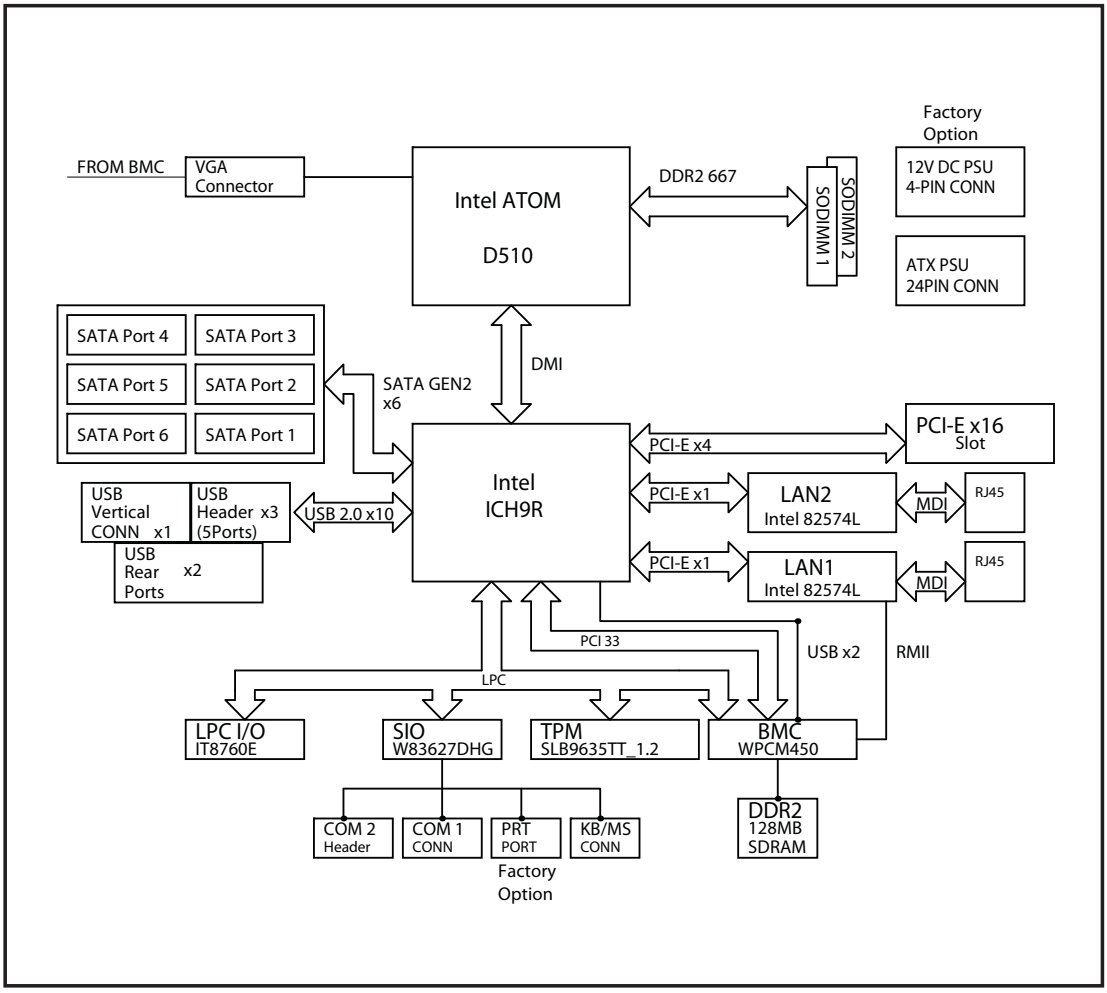


**Figure 1-1. Intel 945GC Chipset: System Block Diagram**

**Note:** This is a general block diagram. Please see Chapter 5 for details.

## 1-3 Server Chassis Features

The following is a general outline of the main features of the SC502L-200B 1U mini rackmount server chassis.

### System Power

The SC502L-200B chassis includes a single 200W power supply.

### SATA Subsystem

The SC502L-200B chassis was designed to support one 3.5" or two 2.5" internal SATA drives (not hot-swappable). ATA/100 IDE drives can be alternately supported.

**Note:** The operating system you use must have RAID support to enable the hot-swap capability of the SATA drives (RAID 0, 1, 5 and 10 supported).

### Control Panel

The control panel on the SC502L-200B provides important system monitoring and control information. LEDs indicate power on, network activity, hard disk drive activity and system overheat. The control panel also includes a main power button and a system reset button as well as two

### Rear I/O Panel

The rear I/O panel on the SC502L-200B provides one COM port, two USB ports, PS/2 mouse and keyboard ports, a graphics port and two Gb Ethernet ports (one on the 5015A-L).

### Expansions Cards

The SC502L-200B supports the use of one full-height, half length PCI expansion card.

## 1-4 Contacting Supermicro

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# Notes

# Chapter 2

# Server Installation

## 2-1 Overview

This chapter provides a quick setup checklist to get your SuperServer 5015A-PHF up and running. Following the steps in the order given should enable you to have the system operational within a minimal amount of time. This quick setup assumes that your 5015A-PHF system has come to you with the processor and memory preinstalled. If your system is not already fully integrated with a motherboard, processor, system memory etc., please turn to the chapter or section noted in each step for details on installing specific components.

## 2-2 Unpacking the System

You should inspect the box the SuperServer 5015A-PHF was shipped in and note if it was damaged in any way. If the server itself shows damage, you should file a damage claim with the carrier who delivered it.

Decide on a suitable location for the rack unit that will hold the SuperServer 5015A-PHF. It should be situated in a clean, dust-free area that is well ventilated. Avoid areas where heat, electrical noise and electromagnetic fields are generated. You will also need it placed near a grounded power outlet. Read the Rack and Server Precautions in the next section.

## 2-3 Preparing for Setup

The box your chassis was shipped in should include four mounting screws, which you will need if you intend to install the system into a rack. Please read this section in its entirety before you begin the installation procedure outlined in the sections that follow.

### Choosing a Setup Location

- Leave enough clearance in front of the rack to enable you to open the front door completely (~25 inches).

- Leave approximately 30 inches of clearance in the back of the rack to allow for sufficient airflow and ease in servicing.
- This product is for installation only in a Restricted Access Location (dedicated equipment rooms, service closets, etc.).
- This product is not suitable for use with visual display work place devices according to §2 of the the German Ordinance for Work with Visual Display Units.

## Warnings and Precautions!

### Rack Precautions

- Ensure that the leveling jacks on the bottom of the rack are fully extended to the floor with the full weight of the rack resting on them.
- In a single rack installation, stabilizers should be attached to the rack.
- In multiple rack installations, the racks should be coupled together.
- Always make sure the rack is stable before extending a component from the rack.
- You should extend only one component at a time - extending two or more simultaneously may cause the rack to become unstable.

### Server Precautions

- Review the electrical and general safety precautions in Chapter 4.
- Determine the placement of each component in the rack *before* you install the rails.
- Install the heaviest server components on the bottom of the rack first, and then work up.
- Use a regulating uninterruptible power supply (UPS) to protect the server from power surges, voltage spikes and to keep your system operating in case of a power failure.
- Allow the power supply units and hot plug Serial ATA drives to cool before touching them.

- Always keep the rack's front door and all panels and components on the servers closed when not servicing to maintain proper cooling.

## Rack Mounting Considerations

### *Ambient Operating Temperature*

If installed in a closed or multi-unit rack assembly, the ambient operating temperature of the rack environment may be greater than the ambient temperature of the room. Therefore, consideration should be given to installing the equipment in an environment compatible with the manufacturer's maximum rated ambient temperature (Tmra).

### *Reduced Airflow*

Equipment should be mounted into a rack so that the amount of airflow required for safe operation is not compromised.

### *Mechanical Loading*

Equipment should be mounted into a rack so that a hazardous condition does not arise due to uneven mechanical loading.

### *Circuit Overloading*

Consideration should be given to the connection of the equipment to the power supply circuitry and the effect that any possible overloading of circuits might have on overcurrent protection and power supply wiring. Appropriate consideration of equipment nameplate ratings should be used when addressing this concern.

### *Reliable Ground*

A reliable ground must be maintained at all times. To ensure this, the rack itself should be grounded. Particular attention should be given to power supply connections other than the direct connections to the branch circuit (i.e. the use of power strips, etc.).

## 2-4 Rack Mounting Instructions

This section provides information on installing the SC502 chassis into a rack unit There are a variety of rack units on the market, which may mean the assembly procedure will differ slightly. You should also refer to the installation instructions that came with the rack unit you are using.

***Installing the Chassis into a Rack***

1. Confirm that chassis includes the four mounting screws required to mount the chassis into a rack

2. Align the thru holes of the chassis with the thru holes of the rack.

3. Insert the mounting screws into the thru holes in the front of the chassis and through the thru holes in the rack

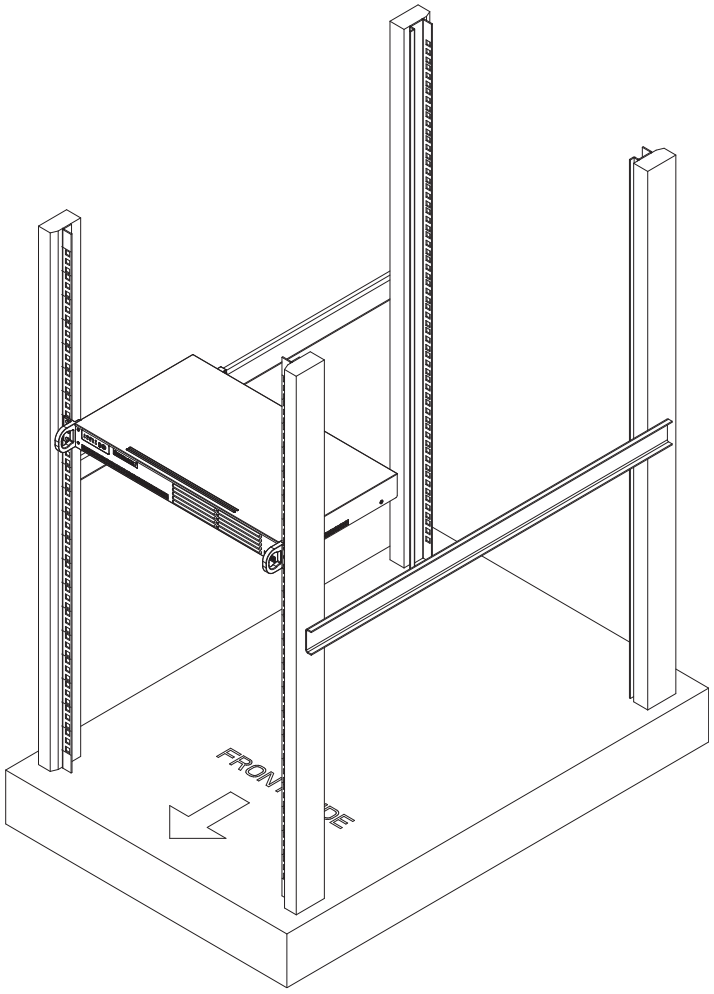


**Figure 2-1. Installing the Chassis into a Rack**

## Installing into a Telco Rack

The SC502 supports Telco Rack installation. The SC502 chassis compact design allows the chassis to be installed into a Telco rack without the use of rails.

***Installing the Chassis into a Telco Rack***

1. Confirm that chassis includes the four mounting screws required to mount the chassis into a rack

2. Align the thru holes of the chassis with the thru holes of the rack.

3. Insert the mounting screws into the thru holes in the front of the chassis and through the thru holes in the rack

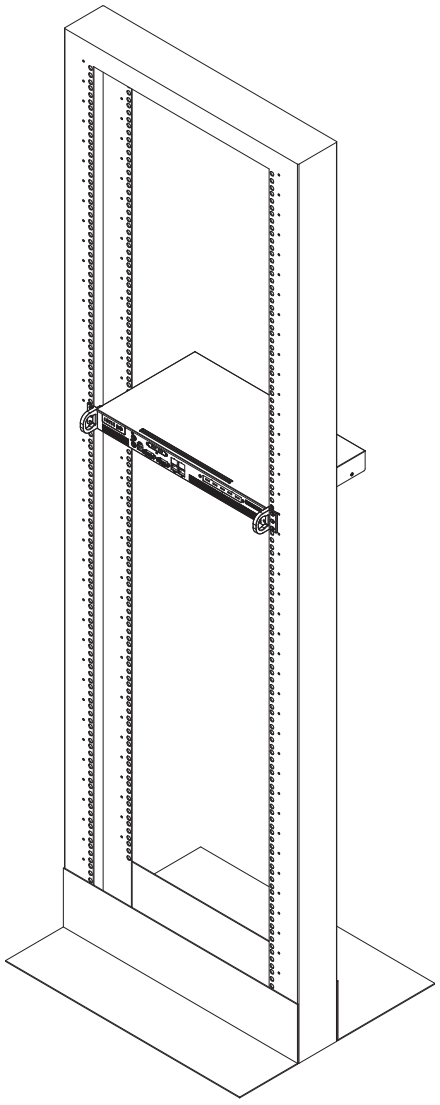


**Figure 2-2. Installing the Chassis into a Telco Rack**

## 2-5 Checking the Motherboard Setup

After you install the 5015A-PHF in the rack, you will need to open the unit to make sure the motherboard is properly installed and all the connections have been made.

***Accessing the Inside of the System (Figure 2-3)***

1. First, grasp the two handles on either side and pull the unit straight out until it locks (you will hear a "click").

2. Remove the five screws that hold the chassis cover in place.There are two screws on each side of the chassis, and one screw on the back.

3. Once the screws have been removed, lift the cover upward to remove it from the chassis.

***Checking the Components***

4. Your 5015A-PHF server system may have come with system memory already installed. Make sure all DIMMs are fully seated in their slots. For details on adding system memory, refer to Chapter 5.

5. If desired, you can install an add-on card to the system. See Chapter 5 for details on installing a PCI add-on card.

6. Make sure all power and data cables are properly connected and not blocking the airflow. See Chapter 5 for details on cable connections.

**Warning:** Except for short periods of time, do NOT operate the server without the cover in place. The chassis cover must be in place to allow proper airflow and prevent overheating.

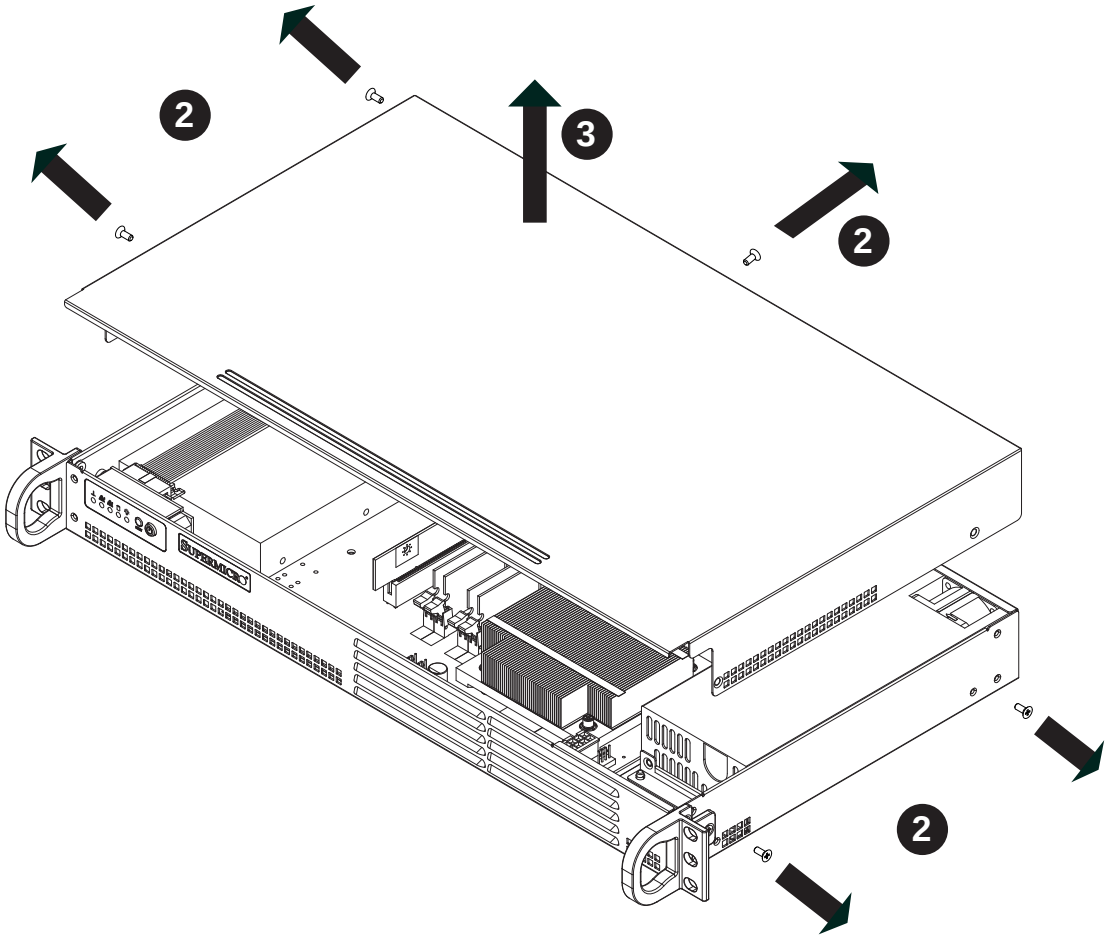



**Figure 2-3. Accessing the Inside of the System**

## 2-6 Checking the Drive Bay Setup

Next, you should check to make sure the drives have been properly installed and all essential connections have been made.

***Checking the Drives***

1. Refer to Chapter 6 if you need to reinstall a DVD-ROM drive to the system.

2. Depending upon your system's configuration, your system may have one or two Serial ATA drives already installed. If you need to install Serial ATA drives, please refer to the appropriate section in Chapter 6.

***Providing Power***

1. The last thing you must do is to provide input power to the system. Plug the power cord from the power supply unit into a high-quality power strip that offers protection from electrical noise and power surges. It is recommended that you use an uninterruptible power supply (UPS).

2. Finish by depressing the power button on the chassis control panel.

# Chapter 3

# System Interface

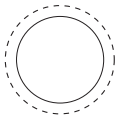
## 3-1 Overview

There are several LEDs on the control panel to keep you constantly informed of the overall status of the system as well as the activity and health of specific components. There are also two buttons on the control panel. This chapter explains the meanings of all LED indicators and the appropriate response you may need to take.

## 3-2 Control Panel Buttons

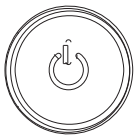
There are two push buttons located on the front of the chassis: a reset button and a power on/off button.

RESET



### Reset Button

The reset button reboots the system.



### Power

This is the main power button, which is used to apply or turn off the main system power. Turning off system power with this button removes the main power but keeps standby power supplied to the system. If you need to service the system you should unplug the AC power cord after shutting down the server.

## 3-3 Control Panel LEDs

The control panel located on the front of the chassis has five LEDs. These LEDs provide you with critical information related to different parts of the system. This section explains what each LED indicates when illuminated and any corrective action you may need to take.

### Overheat

When this LED is on it indicates an overheat condition, which may be caused by cables obstructing the airflow in the system or the ambient room temperature being too warm. Check the routing of the cables and make sure all fans are present and operating normally. You should also check to make sure that the chassis covers are installed. Finally, verify that the heatsinks are installed properly (see Chapter 5). This LED will remain on as long as the indicated condition exists.

### NIC2

Indicates network activity on LAN2 when flashing .

### NIC1

Indicates network activity on LAN1 when flashing.

### HDD

Channel activity for all HDDs. This light indicates IDE or SATA drive activity when flashing.

### Power

Indicates power is being supplied to the system's power supply units. This LED should normally be illuminated when the system is operating.

## Notes

# Chapter 4

# System Safety

## 4-1 Electrical Safety Precautions

Basic electrical safety precautions should be followed to protect yourself from harm and the SuperServer 5015A-PHF from damage:

- Be aware of the locations of the power on/off switch on the chassis as well as the room's emergency power-off switch, disconnection switch or electrical outlet. If an electrical accident occurs, you can then quickly remove power from the system.

- Do not work alone when working with high voltage components.

- Power should always be disconnected from the system when removing or installing main system components, such as the motherboard, memory modules and floppy drive. When disconnecting power, you should first power down the system with the operating system first and then unplug the power cords of all the power supply units in the system.

- When working around exposed electrical circuits, another person who is familiar with the power-off controls should be nearby to switch off the power if necessary.

- Use only one hand when working with powered-on electrical equipment. This is to avoid making a complete circuit, which will cause electrical shock. Use extreme caution when using metal tools, which can easily damage any electrical components or circuit boards they come into contact with.

- Do not use mats designed to decrease static electrical discharge as protection from electrical shock. Instead, use rubber mats that have been specifically designed as electrical insulators.

- The power supply power cords must include a grounding plug and must be plugged into grounded electrical outlets.

- Motherboard Battery: **CAUTION** - There is a danger of explosion if the onboard battery is installed upside down, which will reverse its polarites (see Figure 4-1). This battery must be replaced only with the same or an equivalent type recommended by the manufacturer. Dispose of used batteries according to the manufacturer's instructions.

- DVD-ROM Laser: **CAUTION** - this server may have come equipped with a DVD-ROM drive. To prevent direct exposure to the laser beam and hazardous radiation exposure, do not open the enclosure or use the unit in any unconventional way.

- Mainboard replaceable soldered-in fuses: Self-resetting PTC (Positive Temperature Coefficient) fuses on the mainboard must be replaced by trained service technicians only. The new fuse must be the same or equivalent as the one replaced. Contact technical support for details and support.

## 4-2 General Safety Precautions

Follow these rules to ensure general safety:

- Keep the area around the 5015A-PHF clean and free of clutter.

- The 5015A-PHF weighs approximately 10 lbs (4.5 kg). When lifting the system, two people at either end should lift slowly with their feet spread out to distribute the weight. Always keep your back straight and lift with your legs.

- Place the chassis top cover and any system components that have been removed away from the system or on a table so that they won't accidentally be stepped on.

- While working on the system, do not wear loose clothing such as neckties and unbuttoned shirt sleeves, which can come into contact with electrical circuits or be pulled into a cooling fan.

- Remove any jewelry or metal objects from your body, which are excellent metal conductors that can create short circuits and harm you if they come into contact with printed circuit boards or areas where power is present.

- After accessing the inside of the system, close the system back up and secure it to the rack unit with the retention screws after ensuring that all connections have been made.

## 4-3 ESD Precautions

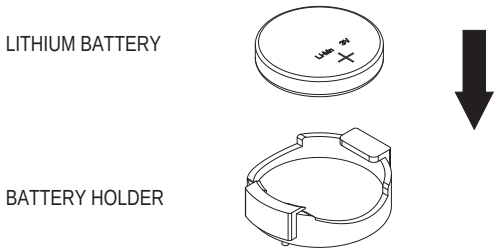
Electrostatic Discharge (ESD) is generated by two objects with different electrical charges coming into contact with each other. An electrical discharge is created to neutralize this difference, which can damage electronic components and printed circuit boards. The following measures are generally sufficient to neutralize this difference before contact is made to protect your equipment from ESD:

- Use a grounded wrist strap designed to prevent static discharge.
- Keep all components and printed circuit boards (PCBs) in their antistatic bags until ready for use.
- Touch a grounded metal object before removing the board from the antistatic bag.
- Do not let components or PCBs come into contact with your clothing, which may retain a charge even if you are wearing a wrist strap.
- Handle a board by its edges only; do not touch its components, peripheral chips, memory modules or contacts.
- When handling chips or modules, avoid touching their pins.
- Put the motherboard and peripherals back into their antistatic bags when not in use.
- For grounding purposes, make sure your computer chassis provides excellent conductivity between the power supply, the case, the mounting fasteners and the motherboard.

## 4-4 Operating Precautions

Care must be taken to assure that the chassis cover is in place when the 5015A-PHF is operating to assure proper cooling. Out of warranty damage to the system can occur if this practice is not strictly followed.

**Figure 4-1. Installing the Onboard Battery**




Please handle used batteries carefully. Do not damage the battery in any way; a damaged battery may release hazardous materials into the environment. Do not discard a used battery in the garbage or a public landfill. Please comply with the regulations set up by your local hazardous waste management agency to dispose of your used battery properly.

# Chapter 5

# Advanced Motherboard Setup

This chapter covers the steps required to install the X7SPA-HF motherboard into the chassis, connect the data and power cables and install add-on cards. All motherboard jumpers and connections are also described. A layout and quick reference chart are included in this chapter for your reference. Remember to completely close the chassis when you have finished working with the motherboard to better cool and protect the system.

## 5-1 Handling the Motherboard

Electrostatic Discharge (ESD) can damage electronic components. To prevent damage to any printed circuit boards (PCBs), it is important to handle them very carefully (see previous chapter). To prevent the motherboard from bending, keep one hand under the center of the board to support it when handling. The following measures are generally sufficient to protect your equipment from electric static discharge.

### Precautions

- Use a grounded wrist strap designed to prevent Electrostatic Discharge (ESD).
- Touch a grounded metal object before removing any board from its antistatic bag.
- Handle a board by its edges only; do not touch its components, peripheral chips, memory modules or gold contacts.
- When handling chips or modules, avoid touching their pins.
- Put the motherboard, add-on cards and peripherals back into their antistatic bags when not in use.
- For grounding purposes, make sure your computer chassis provides excellent conductivity between the power supply, the case, the mounting fasteners and the motherboard.

### Unpacking

The motherboard is shipped in antistatic packaging to avoid electrical static discharge. When unpacking the board, make sure the person handling it is static protected.

## 5-2 Motherboard Installation

This section explains the first step of physically mounting the X7SPA-HF into the SC502L-200B chassis. Following the steps in the order given will eliminate the most common problems encountered in such an installation. To remove the motherboard, follow the procedure in reverse order.

***Installing to the Chassis***

1. Access the inside of the system by removing the screws from the top cover of the chassis, then lift the cover off.

2. Make sure that the I/O ports on the motherboard align properly with their respective holes in the I/O shield at the back of the chassis.

3. Carefully mount the motherboard to the motherboard tray by aligning the board holes with the raised metal standoffs that are visible in the chassis.

4. Insert screws into all the mounting holes on your motherboard that line up with the standoffs and tighten until snug (if you screw them in too tight, you might strip the threads). Metal screws provide an electrical contact to the motherboard ground to provide a continuous ground for the system.

5. Finish by replacing the top cover of the chassis.

**Warning:** To avoid damaging the motherboard and its components, do not apply any force greater than 8 lbs. per square inch when installing a screw into a mounting hole.

## 5-3 Connecting Cables

Now that the motherboard is installed, the next step is to connect the cables to the board. These include the data cables for the peripherals and control panel and the power cables.

### Connecting Data Cables

The cables used to transfer data from the peripheral devices have been carefully routed to prevent them from blocking the flow of cooling air that moves through the system from front to back. If you need to disconnect any of these cables, you should take care to keep them routed as they were originally after reconnecting them (make sure the red wires connect to the pin 1 locations). The following data cables (with their locations noted) should be connected. (See the motherboard layout for connector locations.)

- Control Panel cable (JF1)
- COM Port cable (COM2)
- Front USB port cable (USB2/3)

### Connecting Power Cables

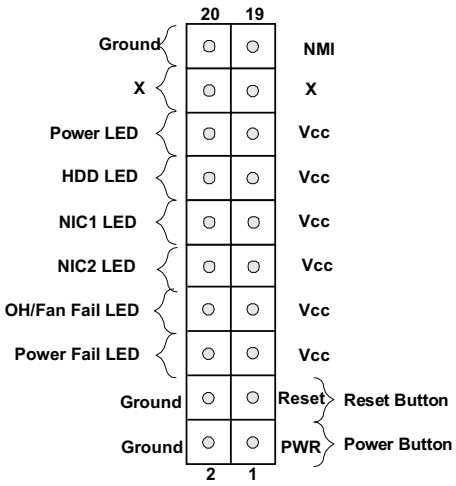
The X7SPA-HF has a 24-pin primary power supply connector (JPW1) for connection to the ATX power supply. See Section 5-9 for power connector pin definitions.

### Connecting the Control Panel

JF1 contains header pins for various front control panel connectors. See Figure 5-1 for the pin locations of the various front control panel buttons and LED indicators.

All JF1 wires have been bundled into a single cable to simplify this connection. Make sure the red wire plugs into pin 1 as marked on the board. The other end connects to the Control Panel PCB board, located just behind the system status LEDs on the chassis. See Chapter 5 for details and pin descriptions.

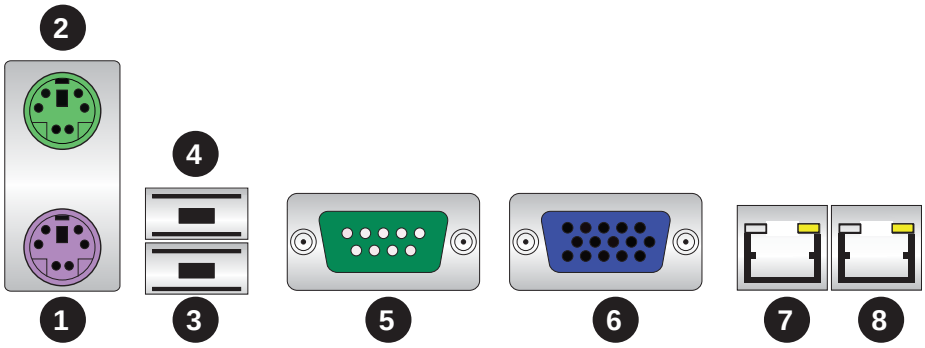
**Figure 5-1. Control Panel Header Pins**




## 5-4 I/O Ports

The I/O ports are color coded in conformance with the PC 99 specification. See Figure 5-2 below for the colors and locations of the various I/O ports.

**Figure 5-2. I/O Ports**




| Rear I/O Ports | |
|---|---|
| 1. Keyboard | 5. COM1 |
| 2. PS/2 Mouse | 6. VGA Port |
| 3. USB1 | 7. LAN1 |
| 4. USB2 | 8. LAN2* |

## 5-5 Onboard Processor

The Intel Atom processor is soldered directly onto the motherboard. Installing and removing the processor is not required. A small active heatsink (with fan) sits on the processor to keep it cool.

## 5-6 Installing Memory

**Note**: Check the Supermicro web site for recommended memory modules.

***CAUTION***

Exercise extreme care when installing or removing DIMM modules to prevent any possible damage.

### DIMM Installation

1. Insert the desired number of DIMMs into the memory slots, starting with DIMM1. Insert each DIMM vertically into its slot. Pay attention to the notch along the bottom of the module to prevent incorrect installation.

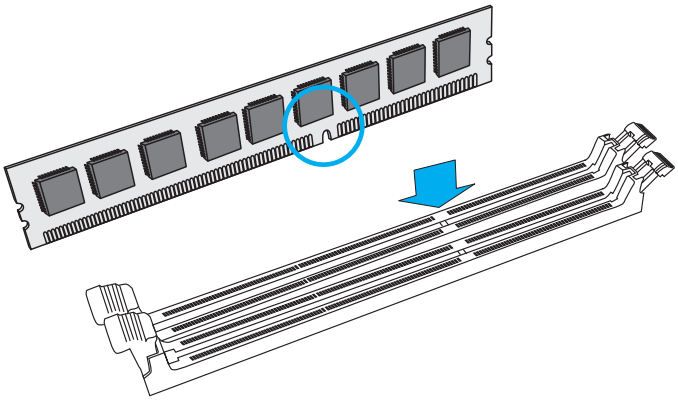
2. Gently press down on the DIMM module until it snaps into place in the slot. Repeat step 1 to install DIMM2 if needed. See diagrams on the following page.

### Memory Support

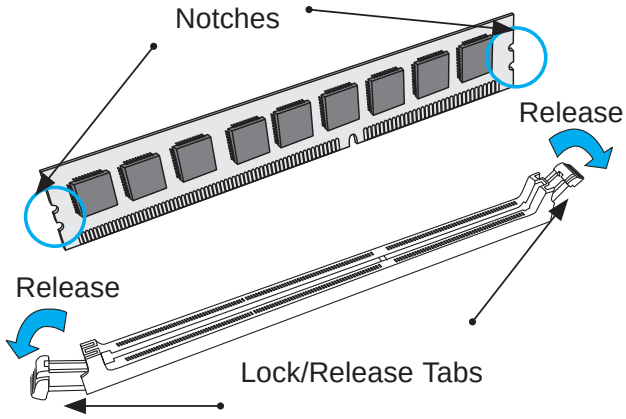
The X7SPA-HF supports up to 4GB unbuffered Non-ECC DDR2 667 in two DIMM slots. Populating the memory slots with a pair of memory modules of the same type and same size will result in interleaved memory, which will improve memory performance.

**Figure 5-3. DIMM Installation**

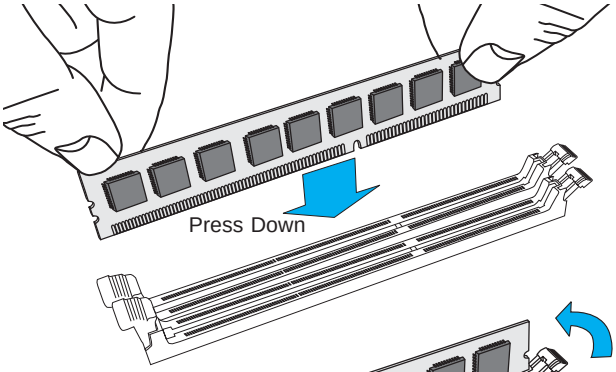
Position the DIMM module's bottom key so it aligns with the receptive point on the slot.



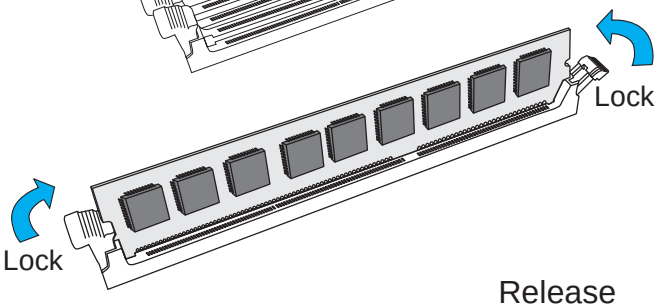
Push the Lock/Release tabs to their Release positions. Make sure that the DIMM module's side notches align with the slot's Lock/Release tabs as it is pressed in.



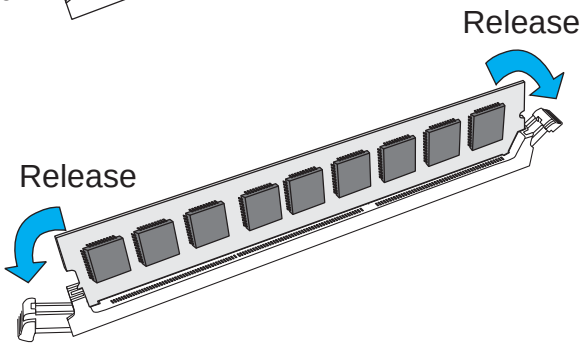

Insert the DIMM module vertically and press down until the module snaps into place.




When the module is properlly inserted, the Lock/Release tabs will automatically secure the DIMM module, locking it into place.




**To Remove:**
Use your thumbs to gently push the Lock/Release tabs near both ends of the module. This should release it from the slot. Pull the DIMM module upwards.



## 5-7 Adding PCI Expansion Cards

The SC502L-200B chassis can accommodate one full-height, half-length PCI expansion card.

***Installing an Expansion Card***

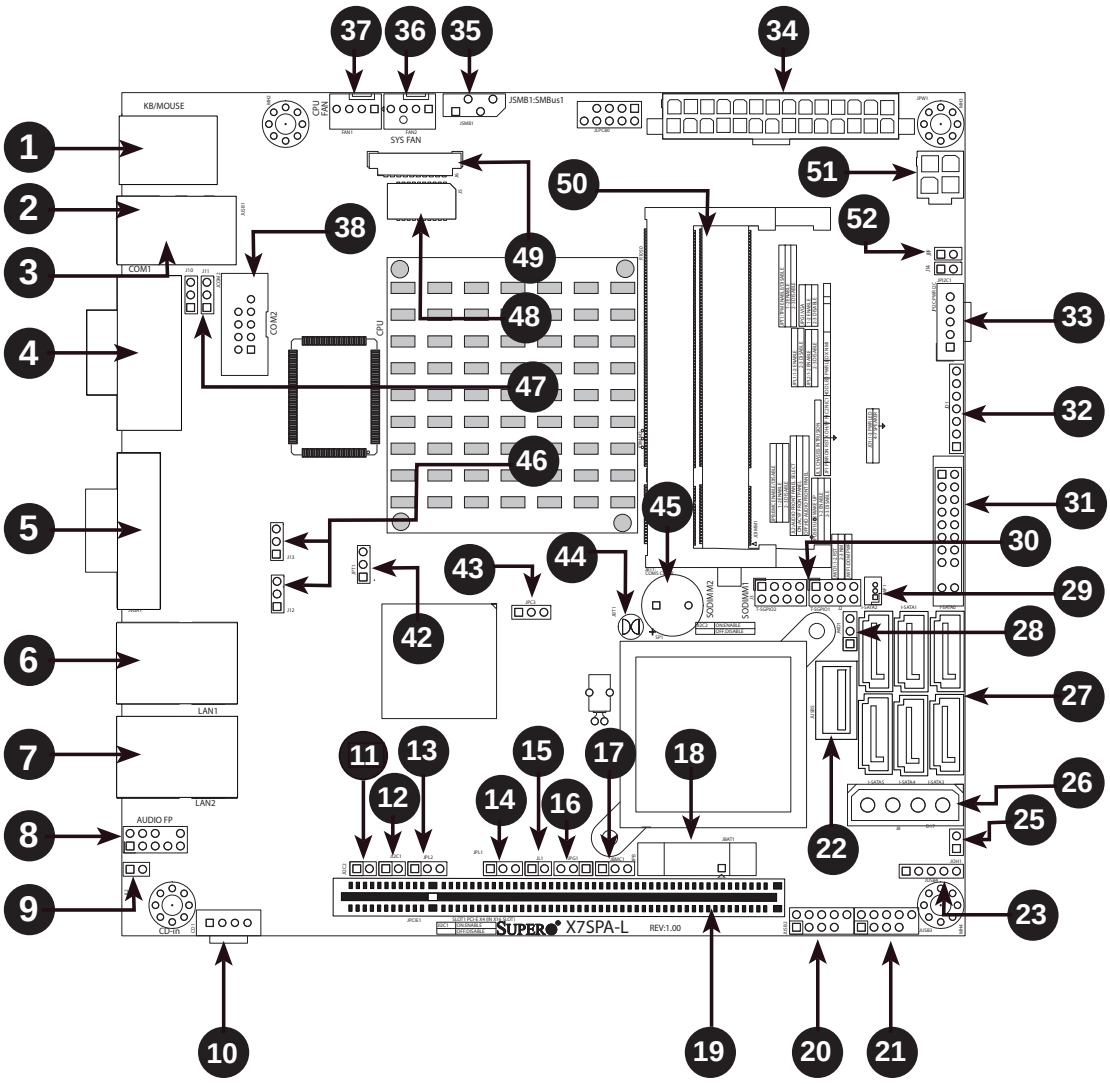
1. After powering down the system, remove the PCI slot shield.

2. Fully seat the card into the slot, pushing down with your thumbs evenly on both sides of the card.

3. Finish by using a screw to secure the top of the card shield to the chassis. The PCI slot shield protects the motherboard and its components from EMI and aid in proper ventilation, so make sure it is always in place.

## 5-8 Motherboard Details

**Figure 5-4. X7SPA-HF Layout**




**Note:** Jumpers not indicated are for test purposes only.

| Number | Jumper | Description | Default Setting |
|---|---|---|---|
| 9 | JL2 | AC97/HD Audio Selector | Open (HD Audio) |
| 12, 11 | JI²C1/JI²C2 | SMB to PCI Slots | Open/Open (Disabled) |
| 13 | JPL2 | LAN2 Enable/Disable | Pins 1-2 (Enabled) |
| 14 | JPL1 | LAN1 Enable/Disable | Pins 1-2 (Enabled) |
| 16 | JPG1 | Onboard VGA Enable/Disable | Pins 1-2 |
| 17 | JPB | BMC Enable/Disable | Pins 1-2 (Enabled) |
| 28 | JWD1 | Watch Dog Timer | Pins 1-2 (Reset) |
| 42 | JPT1 | Trusted Platform Module En/Dis | Pins 1-2 (Enabled) |
| 43 | JPC3 | COM3 Selection | Pins 1-2 (RS232) |

| | | | |
|---|---|---|---|
| 44 | JBT1 | CMOS Clear | (See Section 5-9) |
| 46 | J12/J13* | DCD/P5V Select (COM3/COM4) | Pins 1-2 (DCD ) |
| 47 | J10/J11* | DCD/P5V Select (COM1/COM2) | Pins 1-2 (DCD) |
| 52 | JPF | Power Force On | Open (Disabled) |

*OEM option.

| Number | Connector | Description |
|---|---|---|
| 1 | KB/Mouse | PS/2 Keyboard/Mouse |
| 2, 3 | USB1/2 | Back Panel USB Ports |
| 4 | COM1 | Back Panel Serial Port |
| 5 | VGA | Video/Graphics Port |
| 6 | LAN1 | RJ45 Connector for LAN1 |
| 7 | LAN2 | RJ45 Connector for LAN2 |
| 8 | J5 | Front Panel Audio Header Connector |
| 10 | CD1 | CD/DVD Drive Audio Input Header |
| 15 | JL1 | Chassis Intrusion Header |
| 18 | JBAT1 | Onboard Battery |
| 19 | JPCIE1 | PCI-E 1.1 x4 Gen1 (in x16 physical) Slot |
| 20, 21, 23 | USB 5/6, 7/8, 9 | Front Panel USB Headers |
| 22 | USB 10 | Type A USB Port |
| 25 | JOH | Overheat Warning LED Header |
| 26 | J8 | Power Connector for Add-on Devices |
| 27 | SATA 0,1,2,3,4,5 | SATA Ports |
| 29 | JWF1 | SATA Disk on Module (DOM) Power |
| 30 | T-SGPIO-0/1 | Serial General Purpose IO Headers (for SATA) |
| 31 | JF1 | FP Control Panel Header |
| 32 | JD1 | External Buzzer/Speaker/Power LED |
| 33 | JPI2C | PWR supply ($I^2C$) System Management Bus |
| 34 | JPW1 | ATX 24-Pin Power Connector |
| 35 | JSMB1 | System Management Bus header |
| 37, 36 | Fans 1, 2 | Fan 1: CPU Fan, Fan 2: Chassis Fan Header |
| 38 | COM2 | Serial Port 2 Header |
| 45 | SPK | Onboard Speaker/Buzzer |
| 48 | J5 | 18-bpp LVDS LCD Monitor Port |
| 49 | J6 | Inverter Connector |
| 50 | DIMM 1, DIMM 2 | SO-DIMM Memory Slots |
| 51 | J7 | 4-Pin Processor Power Connector |

# 5-9 Connector Definitions

### Main ATX Power Supply Connector

The 24-pin main power connector (JPW1) is used to provide power to the motherboard. This power connector meets the SSI EPS 12V specification. See the table on the right for pin definitions.

**ATX Power 24-pin Connector Pin Definitions**

| Pin# | Definition | Pin # | Definition |
|---|---|---|---|
| 13 | +3.3V | 1 | +3.3V |
| 14 | -12V | 2 | +3.3V |
| 15 | COM | 3 | COM |
| 16 | PS_ON | 4 | +5V |
| 17 | COM | 5 | COM |
| 18 | COM | 6 | +5V |
| 19 | COM | 7 | COM |
| 20 | Res (NC) | 8 | PWR_OK |
| 21 | +5V | 9 | 5VSB |
| 22 | +5V | 10 | +12V |
| 23 | +5V | 11 | +12V |
| 24 | COM | 12 | +3.3V |

**Required Connection**

### Processor Power Connector

The 4-pin processor power connector (J7) is also required to ensure adequate power to the processor. This power connector meets the SSI EPS 12V specification. See the table on the right for pin definitions.

**4-pin Processor Power Connector Pin Definitions**

| Pins | Definition |
|---|---|
| 1 and 2 | Ground |
| 3 and 4 | +12V |

**Required Connection**

### External Power Connector

In addition to the 24-pin main power connector, the 4-pin External Power connector at J8 is used to provide power to external devices such as hard disks & CD-ROM drives. This power connector supports 12V and 5V devices.

**4-Pin External Power Connector Pin Definitions**

| Pin | Definition |
|---|---|
| 1 | +12V |
| 2 | Ground 1 |
| 3 | Ground 2 |
| 4 | +5V |

**Optional Connection**

### Power Button

The Power Button connection is located on pins 1 and 2 of JF1. Momentarily contacting both pins will power on/off the system. To turn off the power when set to suspend mode, press the button for at least 4 seconds. Refer to the table on the right for pin definitions.

**Power Button Pin Definitions (JF1)**

| Pin# | Definition |
|---|---|
| 1 | Power Signal |
| 2 | Ground |

### Reset Button

The reset button (from the computer chassis) connects to pins 3 and 4 of JF1. See the table on the right for pin definitions.

| Reset Button Pin Definitions (JF1) | |
|---|---|
| Pin# | Definition |
| 3 | Reset |
| 4 | Ground |

### Power Fail LED

The Power Fail LED connection is located on pins 5 and 6 of JF1. Refer to the table on the right for pin definitions.

| PWR Fail LED Pin Definitions (JF1) | |
|---|---|
| Pin# | Definition |
| 5 | Vcc |
| 6 | Ground |

### Overheat/Fan Fail

Connect an LED to pins 7 and 8 of JF1 to indicate fan fail and provide advanced warning of chassis overheating. Refer to the table on the right for pin definitions.

| OH/Fan Fail LED Pin Definitions (JF1) | |
|---|---|
| Pin# | Definition |
| 7 | Vcc |
| 8 | Ground |

| OH/Fan Fail Indicator Status | |
|---|---|
| State | Definition |
| Off | Normal |
| On | Overheat |
| Flashing | Fan Fail |

### NIC2 (LAN2) LED

The LED connections for LAN2 are on pins 9 and 10 of JF1. Attach an LED cable to display network activity. See the table on the right for pin definitions. (LAN2 on 5015A-H only.)

| NIC2 LED Pin Definitions (JF1) | |
|---|---|
| Pin# | Definition |
| 9 | Vcc |
| 10 | Ground |

### NIC1 (LAN1) LED

The LED connections for LAN1 are on pins 11 and 12 of JF1. Attach an LED cable to display network activity. See the table on the right for pin definitions.

| NIC1 LED Pin Definitions (JF1) | |
|---|---|
| Pin# | Definition |
| 11 | Vcc |
| 12 | Ground |

### HDD LED

The HDD LED connection is located on pins 13 and 14 of JF1. Attach a hard drive LED cable here to display disk activity (for any hard drive activity on the system, including SATA and IDE).

| HDD LED Pin Definitions (JF1) | |
|---|---|
| Pin# | Definition |
| 13 | +3.3V |
| 14 | HD Active |

### Power LED

The Power LED connector is located on pins 15 and 16 of JF1. This connection is used to provide LED indication of power being supplied to the system. See the table on the right for pin definitions.

**Power LED Pin Definitions (JF1)**

| Pin# | Definition |
|---|---|
| 15 | 5V Stby |
| 16 | Control |

### NMI Button

The non-maskable interrupt button header is located on pins 19 and 20 of JF1. Refer to the table on the right for pin definitions.

**NMI Button Pin Definitions (JF1)**

| Pin# | Definition |
|---|---|
| 1 | Signal |
| 2 | Ground |

### Fan Headers

The X7SPA-HF has two fan headers. Fan1 is the CPU fan and Fan2 is for the system cooling fan. These fans are 4-pin fan headers. However, Pins 1~3 of the fan headers are backward compatible with the traditional 3-pin fans. (The speeds of 4-pin (PWM) fans are controlled by Thermal Management via BIOS Hardware Monitoring in the Advanced Setting. (The default setting is Disabled.) **Note**: Please use all 3-pin fans or all 4-pin fans on a motherboard. Please do not use 3-pin fans and 4-pin fans on the same board.

**Fan Header Pin Definitions**

| Pin# | Definition |
|---|---|
| 1 | Ground |
| 2 | +12V |
| 3 | Tachometer |
| 4 | PWM Control |

### Overheat/Fan Fail LED (JOH)

The JOH header is used to connect an LED to provide warnings of chassis overheat. This LED will also blink to indicate a fan failure. Refer to the table on right for pin definitions.

**Overheat LED Pin Definitions**

| Pin# | Definition |
|---|---|
| 1 | 5vDC |
| 2 | OH Active |

**OH/Fan Fail LED Status Message**

| State | Message |
|---|---|
| Solid | Overheat |
| Blinking | Fan Fail |

### Front Panel Audio Header

The Front Panel Audio header is used to connect the chassis' front panel High Definition Audio (HDA) controls to the motherboard. See the table on the right for pin definitions.

**High Definition Front Panel Audio**

| Pin # | Definition | Pin # | Definition |
|---|---|---|---|
| 1 | MC_L | 6 | Ground |
| 2 | AUD_GND | 7 | FP_Jack-Detect |
| 3 | MC_R | 8 | Key |
| 4 | FP_Audio-Detect | 9 | Line_2_L |
| 5 | Line_2_R | 10 | Ground |

### Chassis Intrusion

A Chassis Intrusion header is located at JL1 on the motherboard. Attach the appropriate cable from the chassis to inform you of a chassis intrusion when the chassis is opened.

**Chassis Intrusion Pin Definitions (JL1)**

| Pin# | Definition |
|---|---|
| 1 | Intrusion Input |
| 2 | Ground |

### SATA DOM Power

The SATA DOM Power on JWF1 is used to supply power to SATA Disk-on-Module (DOM) solid-state storage devices.

### Power SMB I²C Connector

Power System Management Bus (I²C) Connector monitors the status of the power supply, fan and system temperature. See the table on the right for pin definitions.

**PWR Supply I²C Pin Definitions**

| Pin# | Definition |
|---|---|
| 1 | Clock |
| 2 | Data |
| 3 | PWR Fail |
| 4 | Ground |
| 5 | +3.3V |

### Serial Ports

Two serial ports are included on the motherboard. COM1 is a backpanel port and COM2 is a header located behind the I/O ports. See the table on the right for pin definitions.

**Serial Port Pin Definitions (COM1/COM2)**

| Pin # | Definition | Pin # | Definition |
|---|---|---|---|
| 1 | DCD | 6 | DSR |
| 2 | RXD | 7 | RTS |
| 3 | TXD | 8 | CTS |
| 4 | DTR | 9 | RI |
| 5 | Ground | 10 | NC |

### CD Header

A 4-pin CD header is located at CD1. This header allows you to use the on-board sound for audio CD playback. Connect an audio cable from your CD drive to the header that fits your cable's connector. See the table at right for pin definitions.

**CD Header Pin Definitions**

| Pin# | Definition |
|---|---|
| 1 | Left Stereo Signal |
| 2 | Ground |
| 3 | Ground |
| 4 | Right Stereo Signal |

### SMB

A System Management Bus (SMB) header is located at JSMB. Connect the appropriate cable here to use the SMB $I^2C$ connection on your system.

**SMB Header Pin Definition**

| Pin# | Definition |
|---|---|
| 1 | Data |
| 2 | Ground |
| 3 | Clock |
| 4 | No Connection |

### T-SGPIO 0/1 Headers

Two T-SGPIO (Serial-Link General Purpose Input/Output) headers are located near the SATA connectors on the motherboard. These headers are used to communicate with the enclosure management chip in the system. See the table on the right for pin definitions. Refer to the board layout below for the locations of the headers.

**SGPIO Header Pin Definitions**

| Pin# | Definition | Pin | Definition |
|---|---|---|---|
| 1 | NC | 2 | NC |
| 3 | Ground | 4 | DATA Out |
| 5 | Load | 6 | Ground |
| 7 | Clock | 8 | NC |

### ATX PS/2 Keyboard and PS/2 Mouse Ports

The ATX PS/2 keyboard and the PS/2 mouse are located beside the USB0/1 ports. The mouse port is above the keyboard port. See the table on the right for pin definitions.

**PS/2 Keyboard and Mouse Port Pin Definitions (J28)**

| Pin# | Definition |
|---|---|
| 1 | Data |
| 2 | NC |
| 3 | Ground |
| 4 | VCC |
| 5 | Clock |
| 6 | NC |

### LAN1/2 (Ethernet Ports)

Two Ethernet ports (designated LAN1 and LAN2) are located beside the VGA port on the I/O backplane. These ports accept RJ45 type cables.

### LVDS Connector

An LVDS connector (J5) is available on the X7SPA-L only. This connector provides 18-bit LVDS (Low Voltage Differential Signaling) for an LCD panel or other similar devices. Refer to the table on the right for pin definitions.

**LVDS Pin Definitions**

| Pin# | Definition | Pin | Definition |
|---|---|---|---|
| 1 | 3.3V | 11 | 3.3V |
| 2 | LDATAP0 | 12 | LDATAN0 |
| 3 | GND | 13 | GND |
| 4 | LDATAP1 | 14 | LDATAN1 |
| 5 | GND | 15 | GND |
| 6 | LDATAP2 | 16 | LDATAN2 |
| 7 | GND | 17 | GND |
| 8 | NC | 18 | NC |
| 9 | LVDDEN | 19 | NC |
| 10 | LCLKP | 20 | LCLKN |

### Inverter Power Connector

The inverter connector on J6 is a 7-pin connector and is used in conjunction with the LVDS connector. Connect the backlight module of the LCD panel to this socket. This controls the backlight lamp, PWM control signals, and inverter power..

**Inverter Power Pin Definitions**

| Pin # | Definition | Pin # | Definition |
|---|---|---|---|
| 1 | 12V | 6 | 3.3V |
| 2 | 12V | 7 | GND |
| 3 | GND | 8 | GND |
| 4 | GND | 9 | BKLTEN |
| 5 | 3.3V | 10 | BKLTCTL |

### Universal Serial Bus (USB)

Four Universal Serial Bus ports (USB1/2/3/4) are located on the I/O backpanel. Additionally, one Type A USB port (USB10) and five USB headers (USB5/6, 7/8, 9) are provided on the motherboard to provide front chassis access (cables are not included). See the tables on the right for pin definitions.

**Back Panel USB Ports, Type A USB Port Pin Definitions**

| Pin# | Definition | Pin# | Definition |
|---|---|---|---|
| 1 | +5V | 5 | +5V |
| 2 | USB_PN | 6 | USB_PN |
| 3 | USB_PP | 7 | USB_PP |
| 4 | Ground | 8 | Ground |

**Front Panel USB Header Pin Definitions**

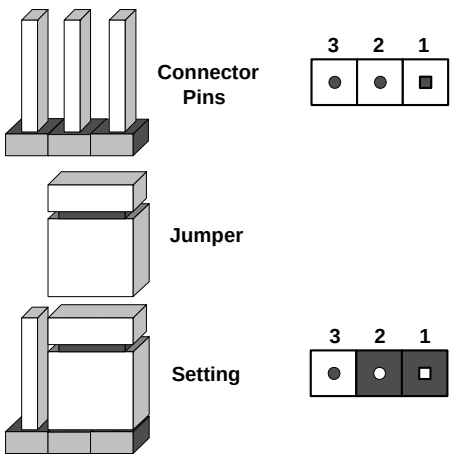
| Pin # | Definition | Pin # | Definition |
|---|---|---|---|
| 1 | +5V | 6 | +5V |
| 2 | USB_PN | 7 | USB_PN |
| 3 | USB_PP | 8 | USB_PP |
| 4 | Ground | 9 | Ground |
| 5 | NA | 10 | Key |

# 5-10 Jumper Settings

### Explanation of Jumpers

To modify the operation of the motherboard, jumpers can be used to choose between optional settings. Jumpers create shorts between two pins to change the function of the connector. Pin 1 is identified with a square solder pad on the printed circuit board. See the motherboard layout pages for jumper locations.

**Note:** On a two-pin jumper, "Closed" means the jumper is on both pins and "Open" means the jumper is either on only one pin or completely removed.




### CMOS Clear

JBT1 is used to clear CMOS (which will also clear any passwords). Instead of pins, this jumper consists of contact pads to prevent accidentally clearing the contents of CMOS.

***To clear CMOS,***

1. First power down the system and unplug the power cord(s).
2. With the power disconnected, short the CMOS pads with a metal object such as a small screwdriver.
3. Remove the screwdriver (or shorting device).
4. Reconnect the power cord(s) and power on the system.

**Note:** *Do not use the PW_ON connector to clear CMOS.*

### LAN1/2 Enable/Disable

Change the setting of jumper JPL1 and JPL2 to enable or disable the LAN1 and LAN2 Ethernets ports, respectively. See the table on the right for jumper settings. The default setting is enabled.

| LAN1/2 Jumper Settings | |
|---|---|
| Jumper Setting | Definition |
| Pins 1-2 | Enabled |
| Pins 2-3 | Disabled |

### SMB ($I^2C$) Bus to PCI Slots

Jumpers $JI^2C1$ and $JI^2C2$ allow you to connect the System Management Bus (SMB) to the PCI-E PCI slot. The default setting is Disabled. See table on the right for jumper settings.

| $I^2C$ to PCI-Slots Jumper Settings | |
|---|---|
| Jumper | Definition |
| On | Enabled |
| Off | Disabled |

### TPM Support Enable

JPT1 allows the user to enable TPM (Trusted Platform Module) support to enhance data integrity and system security. See the table on the right for jumper settings. The default setting is Enabled.

| TPM Support Jumper Settings | |
|---|---|
| Jumper Setting | Definition |
| 1-2 | Enabled |
| 2-3 | Disabled |

### Watch Dog Enable/Disable

Watch Dog (JWD) is a system monitor that can reboot the system when a software application hangs. Close pins 1~2 to reset the system if an application hangs. Close pins 2~3 to generate a non-maskable interrupt signal for the application that hangs. See the table on the right for jumper settings. Watch Dog must also be enabled in the BIOS.

| Watch Dog Jumper Settings | |
|---|---|
| Jumper Setting | Definition |
| Pins 1-2 | Reset (default) |
| Pins 2-3 | NMI |
| Open | Disabled |

### Power Force On Enable/Disable

Jumper JPF allows you to enable or disable the Power Force On function. If enabled, the power will always stay on automatically. If this function is disabled (the normal setting), the user needs to press the power button to power on the system.

| Power Force On Jumper Settings | |
|---|---|
| Jumper Setting | Definition |
| Open | Normal |
| Closed | Force On |

### VGA Enable/Disable

JPG1 allows the user to enable the onboard VGA connector. Close Pins 1~2 to use this function. The default setting is Enabled.

| VGA Enable Jumper Settings | |
|---|---|
| Pin# | Definition |
| 1-2 | Enabled (default) |
| 2-3 | Disabled |

### DCD / P5V Select

Jumpers J10~J13 allow selection between the standard Data Carrier Detect (DCD) modem signal or the system voltage +5V on pin 1 of the COM1~COM4 ports This is an OEM option only.

| DCD / P5V Select Jumper Settings | |
|---|---|
| Jumper Setting | Definition |
| Pins 1-2 | DCD |
| Pins 2-3 | P5V |

### HDA/AC97 Select

JL2 allows the user to select between High Definition Audio (HDA) or legacy AC97 audio. The default setting is HD Audio.

| HDA/AC97 Jumper Settings | |
|---|---|
| Pin# 1-2 | Definition |
| Open | HD Audio |
| Closed | AC97 |

### COM3 Redirection Select

JPC3 allows selection between RS232 or TTL for COM3 redirection. The default setting is RS232. This is an OEM option only.

| COM3 Redirection Select Jumper Settings | |
|---|---|
| Jumper Setting | Definition |
| Pins 1-2 | RS232 (default) |
| Pins 2-3 | TTL |
| Open | Disabled |

### Speaker Jumper

On the JD1 header, pins 1~3 are used for a power LED and pins 4~7 are used for an external speaker. If you wish to use the onboard speaker, you should close pins 6-7 with a jumper. See the table on the right for speaker pin definitions.

| Speaker Connector Pin Definitions | |
|---|---|
| Pin Setting | Definition |
| Pins 6-7 | Internal Speaker |
| Pins 4-7 | External Speaker |

### BMC Enable/Disable

The JPB jumper is used to enable or disable the onboard Baseboard Management Controller (BMC) and IPMI. This jumper is used together with the IPMI settings in the BIOS. The default position is pins 1 and 2 to Enable BMC. See the table on the right for jumper settings.

| BMC Jumper Settings | |
|---|---|
| Pin Setting | Definition |
| Pins 1-2 | Enabled |
| Pins 2-3 | Disabled |

## 5-11 Onboard Indicators

### LAN1/2 LEDs

The Ethernet ports (located beside the VGA port) have two LEDs. On each port, the yellow LED indicates activity while the other LED may be green, amber or off to indicate the speed of the connection. See the table on the right for the indication associated with the connection speed LED.

| LAN1/2 LED (Connection Speed Indicator) | |
|---|---|
| LED Color | Definition |
| Off | No Connection or 10 Mb/s |
| Green | 100 Mb/s |
| Amber | 1 Gb/s |

## 5-12 SATA Ports

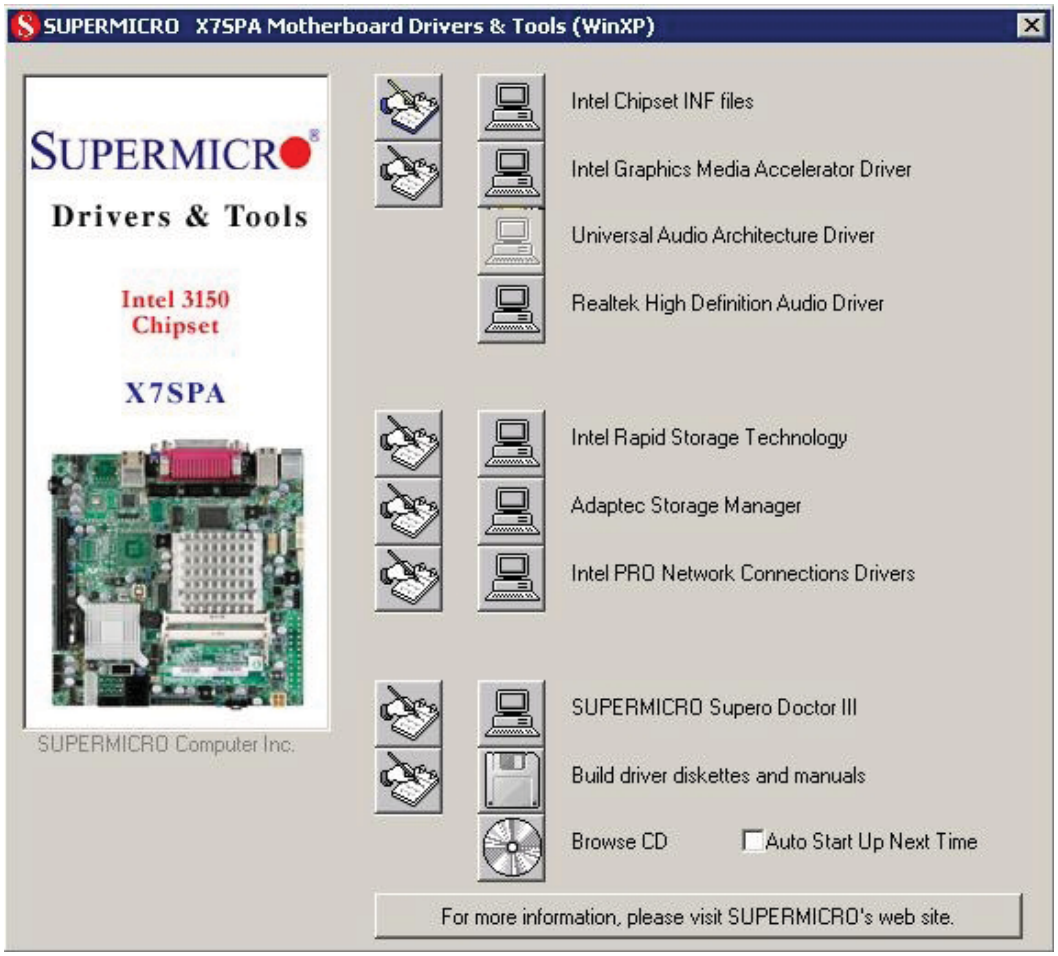
### SATA Ports

Six Serial ATA (SATA) ports (I-SATA 0~5) are located on the motherboard to provide serial link connections. Serial Link connections provide faster data transmission than those of the traditional Parallel ATA. These SATA ports are supported by the Intel ICH9R South Bridge. See the table on the right for pin definitions.

| SATA Port Pin Definitions | | | |
|---|---|---|---|
| Pin# | Definition | Pin # | Definition |
| 1 | Ground | 2 | TXP |
| 3 | TXN | 4 | Ground |
| 5 | RXN | 6 | RXP |
| 7 | Ground | | |

## 5-13 Installing Software

After the hardware has been installed, you should first install the operating system and then the drivers. The necessary drivers are all included on the Supermicro CDs that came packaged with your motherboard.


SUPERMICRO X7SPA Motherboard Drivers & Tools (WinXP)
SUPERMICRO
Drivers & Tools
Intel 3150 Chipset
X7SPA
SUPERMICRO Computer Inc.
Intel Chipset INF files
Intel Graphics Media Accelerator Driver
Universal Audio Architecture Driver
Realtek High Definition Audio Driver
Intel Rapid Storage Technology
Adaptec Storage Manager
Intel PRO Network Connections Drivers
SUPERMICRO Supero Doctor III
Build driver diskettes and manuals
Browse CD
Auto Start Up Next Time
For more information, please visit SUPERMICRO's web site.

**Driver/Tool Installation Display Screen**

**Note:** Click the icons showing a hand writing on paper to view the readme files for each item. Click the computer icons to the right of these items to install each item (from top to the bottom) one at a time. **After installing each item, you must re-boot the system before moving on to the next item on the list.** The bottom icon with a CD on it allows you to view the entire contents of the CD.

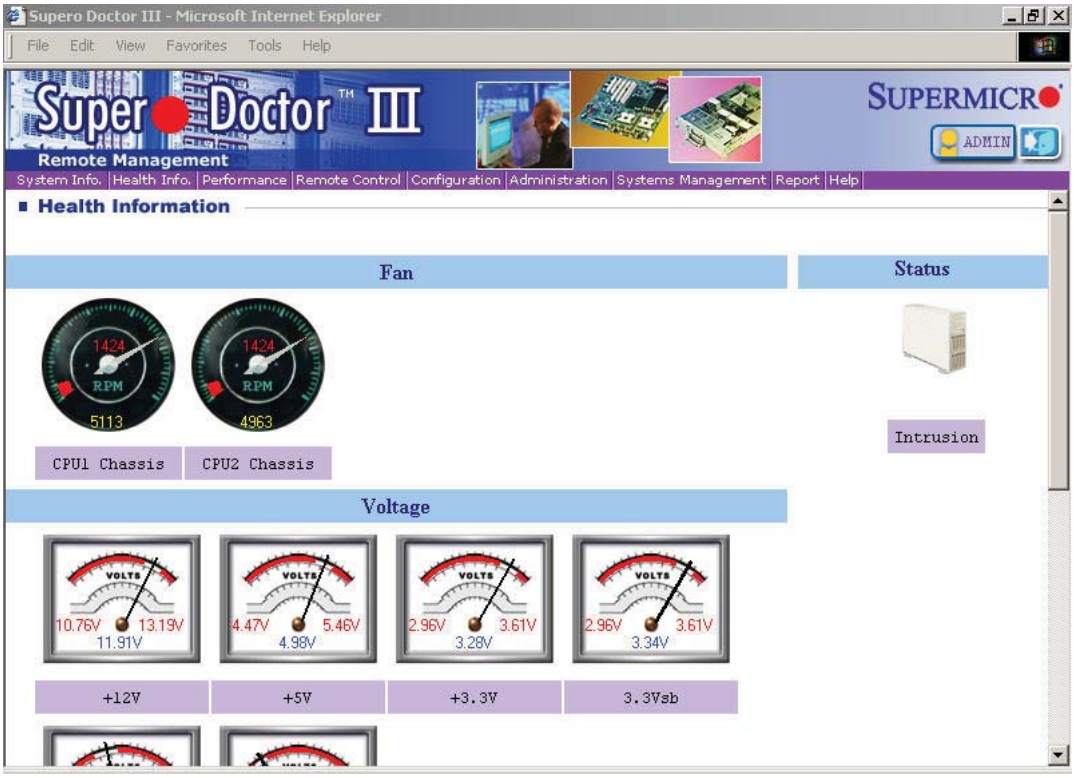
## Supero Doctor III

The Supero Doctor III program is a web-based management tool that supports remote management capability. It includes Remote and Local Management tools. The local management is called SD III Client. The Supero Doctor III program included on the CD-ROM that came with your motherboard allows you to monitor the environment and operations of your system. Supero Doctor III displays crucial system information such as CPU temperature, system voltages and fan status. See the Figure below for a display of the Supero Doctor III interface.

**Note:** The default User Name and Password for SuperDoctor III is ADMIN / ADMIN.

**Note:** When SuperDoctor III is first installed, it adopts the temperature threshold settings that have been set in BIOS. Any subsequent changes to these thresholds must be made within Super Doctor, as the Super Doctor settings override the BIOS settings. To set the BIOS temperature threshold settings again, you would first need to uninstall SuperDoctor III.

**Supero Doctor III Interface Display Screen (Health Information)**



**Supero Doctor III Interface Display Screen (Remote Control)**

Supero Doctor III - Microsoft Internet Explorer
File Edit View Favorites Tools Help
Super Doctor III
Remote Management
SUPERMICRO
ADMIN
System Info. Health Info. Performance Remote Control Configuration Administration Systems Management Report Help
Remote Control
Graceful Power Control
Open Console
Power Control
Enter
Comm.
Graceful power control
Supero Doctor III allows a user to inform the OS to reboot or shut down within a specified time (the default is 30 seconds). Before the system reboots or shuts down, it's allowed to cancel the action.
Requirements
Keep Supero SD3Service Daemon running at all times on this system.
Provide TCP/IP connectivity.
Power control

Note: SD III Software Revision 1.0 can be downloaded from our Web Site at: ftp://ftp.supermicro.com/utility/Supero_Doctor_III/. You can also download the SDIII User's Guide at: <http://www.supermicro.com/PRODUCT/Manuals/SDIII/UserGuide.pdf>. For Linux, we will recommend using Supero Doctor II.

# Chapter 6

# Advanced Chassis Setup

This chapter covers the steps required to install components and perform maintenance on the SC502L chassis. For component installation, follow the steps in the order given to eliminate the most common problems encountered. If a step is unnecessary, skip ahead to the step that follows.

### Tools Required

The only tool you will need to install components and perform maintenance is a Philips screwdriver.

## 6-1 Static-Sensitive Devices

Electrostatic Discharge (ESD) can damage electronic components. To prevent damage to any printed circuit boards (PCBs), it is important to handle them very carefully. The following measures are generally sufficient to protect your equipment from ESD discharge.

### Precautions

- Use a grounded wrist strap designed to prevent static discharge.
- Touch a grounded metal object before removing any board from its antistatic bag.
- Handle a board by its edges only; do not touch its components, peripheral chips, memory modules or gold contacts.
- When handling chips or modules, avoid touching their pins.
- Put the serverboard, add-on cards and peripherals back into their antistatic bags when not in use.
- For grounding purposes, make sure your computer chassis provides excellent conductivity between the power supply, the case, the mounting fasteners and the serverboard.

**Figure 6-1. Chassis Front View**

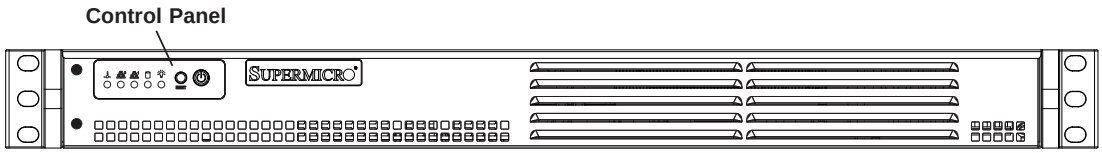
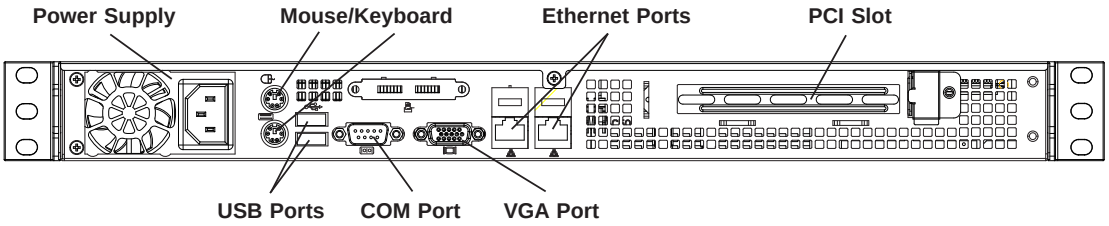



**Figure 6-2. Chassis Rear View**




## 6-2 Control Panel

The control panel (located on the front of the chassis) must be connected to the JF1 connector on the serverboard to provide you with system control buttons and status indicators. These wires have been bundled together in a ribbon cable to simplify the connection.

Connect the cable from JF1 on the serverboard to the Control Panel PCB (printed circuit board). Make sure the red wire plugs into pin 1 on both connectors. Pull all excess cabling out of the airflow path. The LEDs inform you of system status. See Chapter 3 for details on the LEDs and the control panel buttons. Details on JF1 can be found in Chapter 5.

## 6-3 System Fans

The SC502L is a fan-less chassis, which results in extremely quiet and energy-efficient operation. The only fan in the system is located on the heatsink for the embedded processor.

## 6-4 Drive Bay Installation/Removal

***Installling a 3.5" SATA Drive (Figure 6-3)***

1. Power down the system and unplug the AC power cord.
2. Remove the chassis cover as described on page 2-6.
3. Use screws to secure the drive directly into the left side of the chassis as shown in the figure.

***Installling 2.5" SATA Drives (Figure 6-4)***

1. Power down the system and unplug the AC power cord.
2. Remove the chassis cover as described on page 2-6.
3. Use screws to secure the drive into the hard drive bracket:
   For two drives the bracket is p/n MCP-220-00044-0N.
   For one drive the bracket is p/n MCP-220-00051-0N.
4. Use screws to secure the bracket/drive assembly into the left side of the chassis as shown in the figure.

Enterprise level hard disk drives are recommended for use in Supermicro chassis and servers. For information on recommended HDDs, visit the Supermicro Web site at http://www.supermicro.com/products/nfo/files/storage/SAS-1-CompList-110909.pdf

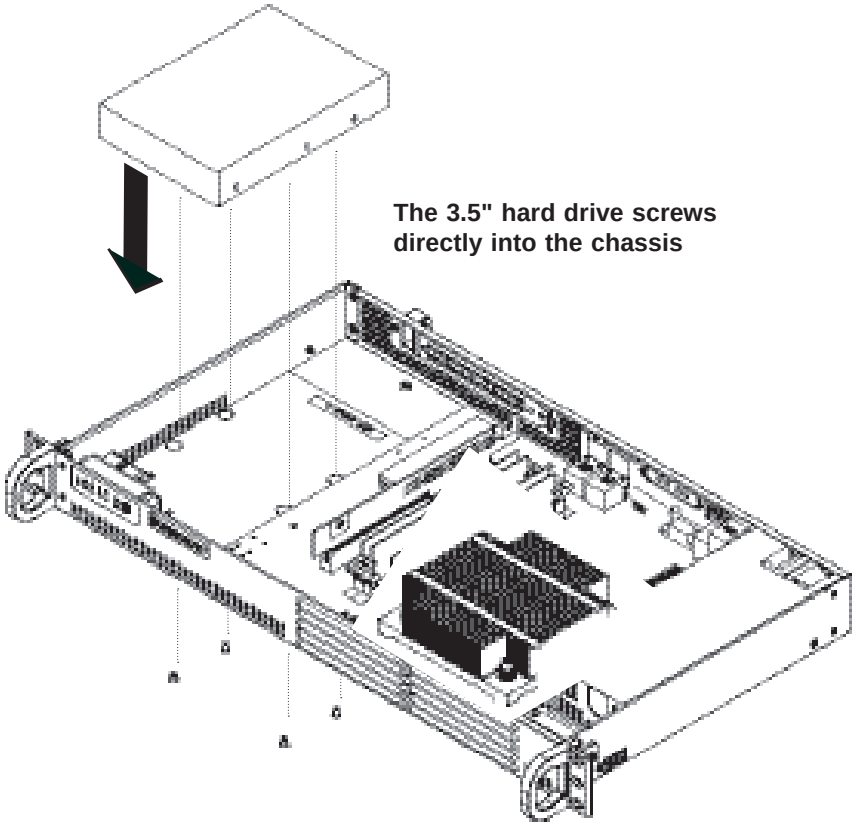



**Figure 6-3. Installing a 3.5" Hard Drive**

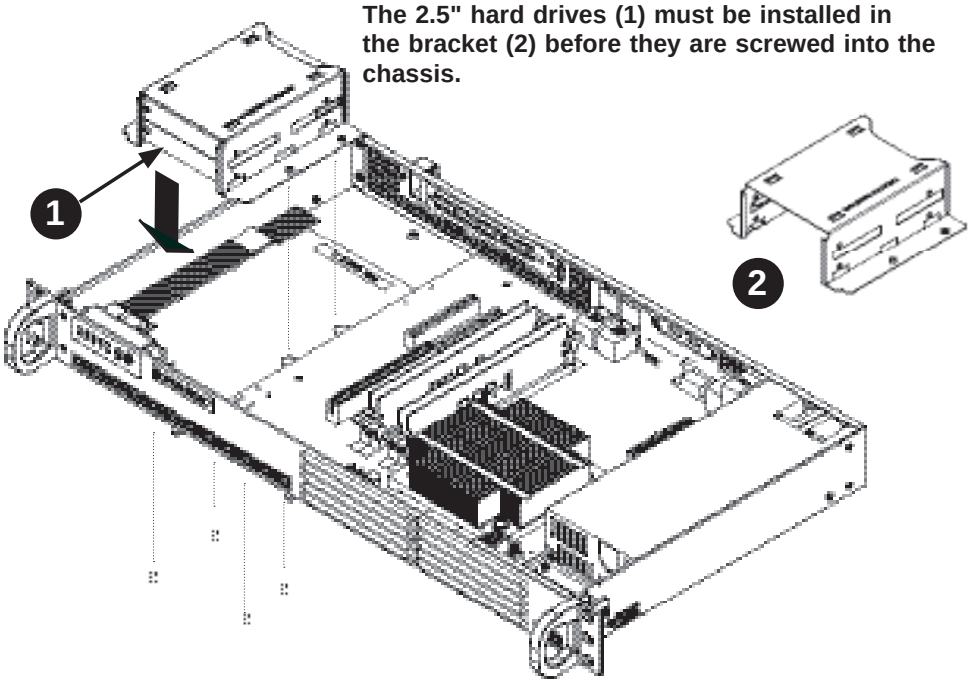



**Figure 6-4. Installing 2.5" Hard Drives**

## 6-5 Power Supply

The SC502L-200B chassis has a single 200 watt power supply. This power supply is auto-switching capable. This enables it to automatically sense and operate at a 100v to 240v input voltage.

In the event that the power supply unit fails, the system will shut down and you will need to change the power supply unit. New units can be ordered directly from Supermicro (see contact information in the Preface).

***Replacing the Power Supply (Figure 6-5)***

1. Power down the system and unplug the AC power cord.
2. Disconnect all wiring from the power supply.
3. Remove the four screws that secure the power supply to the chassis and extend upwards through the mounting thru holes, to hold the power supply in place (two mounting screws are located on the rear of the power supply and two mounting screws are accessed on the underside of the chassis). Set the screws aside for later use.
4. Remove the power supply from the chassis.
5. Align the mounting thru holes on the power supply with the mounting holes in the chassis and reattach the power supply to the chassis using the four screws which were previously set aside
6. Connect the chassis wiring to the power supply.
7. Replace the top cover, reattach the AC power cord and power up the system.

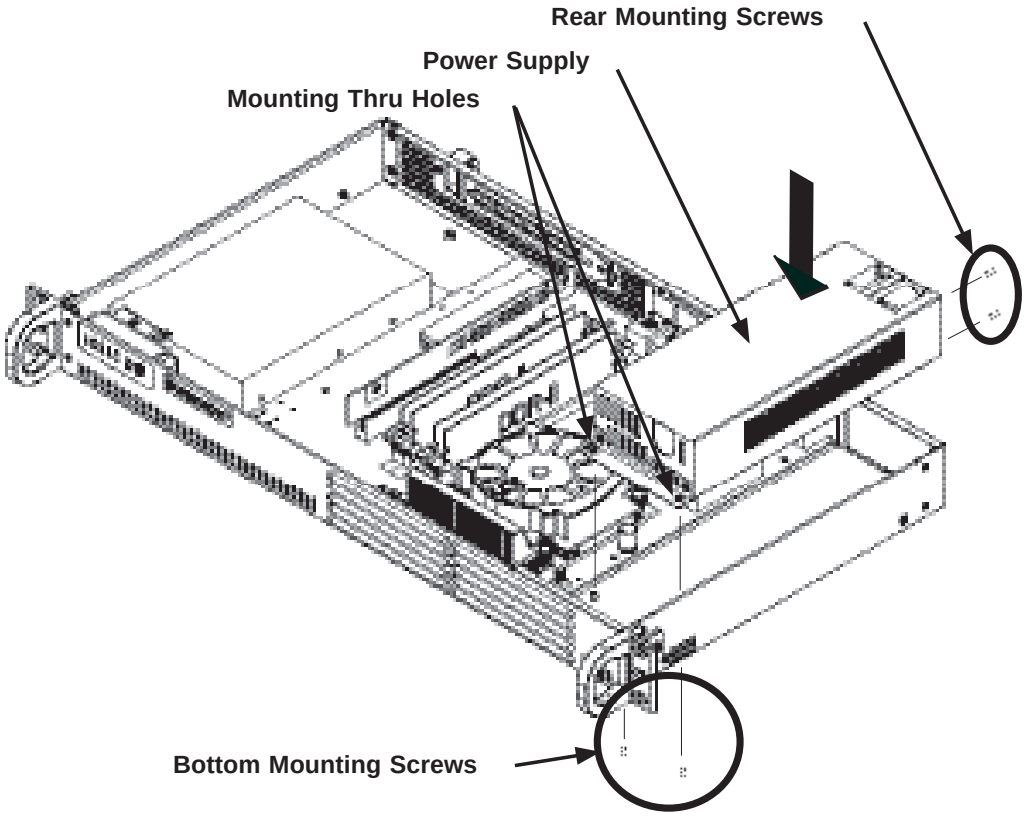



**Figure 6-5. Installing the Power Supply**

# Chapter 7

# BIOS

## 7-1 Introduction

This chapter describes the AMI BIOS Setup Utility for the X7SPA-HF. The AMI ROM BIOS is stored in a Flash EEPROM and can be easily updated. This chapter describes the basic navigation of the AMI BIOS Setup Utility setup screens.

**Note:** For instructions on BIOS recovery, please refer to the instruction guide posted at http://www.supermicro.com/support/manuals/.

### Starting BIOS Setup Utility

To enter the AMI BIOS Setup Utility screens, press the <Delete> key while the system is booting up.

**Note**: In most cases, the <Delete> key is used to invoke the AMI BIOS setup screen. There are a few cases when other keys are used, such as <F1>, <F2>, etc.

Each main BIOS menu option is described in this manual. The Main BIOS setup menu screen has two main frames. The left frame displays all the options that can be configured. Grayed-out options cannot be configured. Options in blue can be configured by the user. The right frame displays the key legend. Above the key legend is an area reserved for a text message. When an option is selected in the left frame, it is highlighted in white. Often a text message will accompany it. (**Note**: the AMI BIOS has default text messages built in. Supermicro retains the option to include, omit, or change any of these text messages.)

The AMI BIOS Setup Utility uses a key-based navigation system called "hot keys". Most of the AMI BIOS setup utility "hot keys" can be used at any time during the setup navigation process. These keys include <F1>, <F10>, <Enter>, <ESC>, arrow keys, etc.

**Note**: Options printed in **Bold** are default settings.

### How To Change the Configuration Data

The configuration data that determines the system parameters may be changed by entering the AMI BIOS Setup utility. This Setup utility can be accessed by pressing <Del> at the appropriate time during system boot.

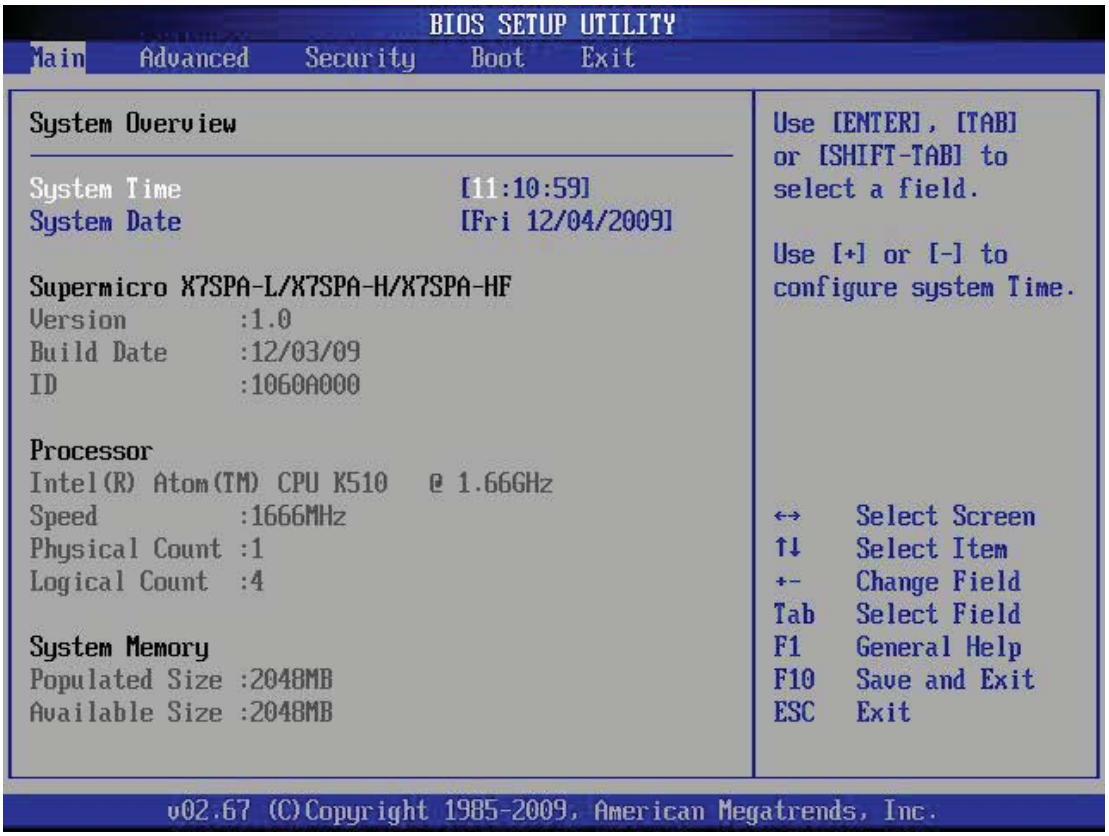
### How to Start the Setup Utility

Normally, the only visible Power-On Self-Test (POST) routine is the memory test. As the memory is being tested, press the <Delete> key to enter the main menu of the AMI BIOS Setup Utility. From the main menu, you can access the other setup screens. An AMI BIOS identification string is displayed at the left bottom corner of the screen, below the copyright message.

**Warning!** Do not upgrade the BIOS unless your system has a BIOS-related issue. Flashing the wrong BIOS can cause irreparable damage to the system. In no event shall Supermicro be liable for direct, indirect, special, incidental, or consequential damages arising from a BIOS update. If you have to update the BIOS, do not shut down or reset the system while the BIOS is updating. This is to avoid possible boot failure.

## 7-2 Main Setup

When you first enter the AMI BIOS Setup Utility, you will enter the Main setup screen. You can always return to the Main setup screen by selecting the Main tab on the top of the screen. The Main BIOS Setup screen is shown below.



**System Overview:** The following BIOS information will be displayed:

**System Time/System Date**

Use this option to change the system time and date. Highlight *System Time* or *System Date* using the arrow keys. Enter new values through the keyboard. Press the <Tab> key or the arrow keys to move between fields. The date must be entered in Day MM/DD/YY format. The time is entered in HH:MM:SS format. (**Note:** The time is in the 24-hour format. For example, 5:30 P.M. appears as 17:30:00.)

Supermicro X7SPA-L/X7SPA-H/X7SPA-HF

Version

Build Date

**Processor**

The AMI BIOS will automatically display the status of processor as shown below:

Type of Processor

Speed

Physical Count

Logical Count

**System Memory**

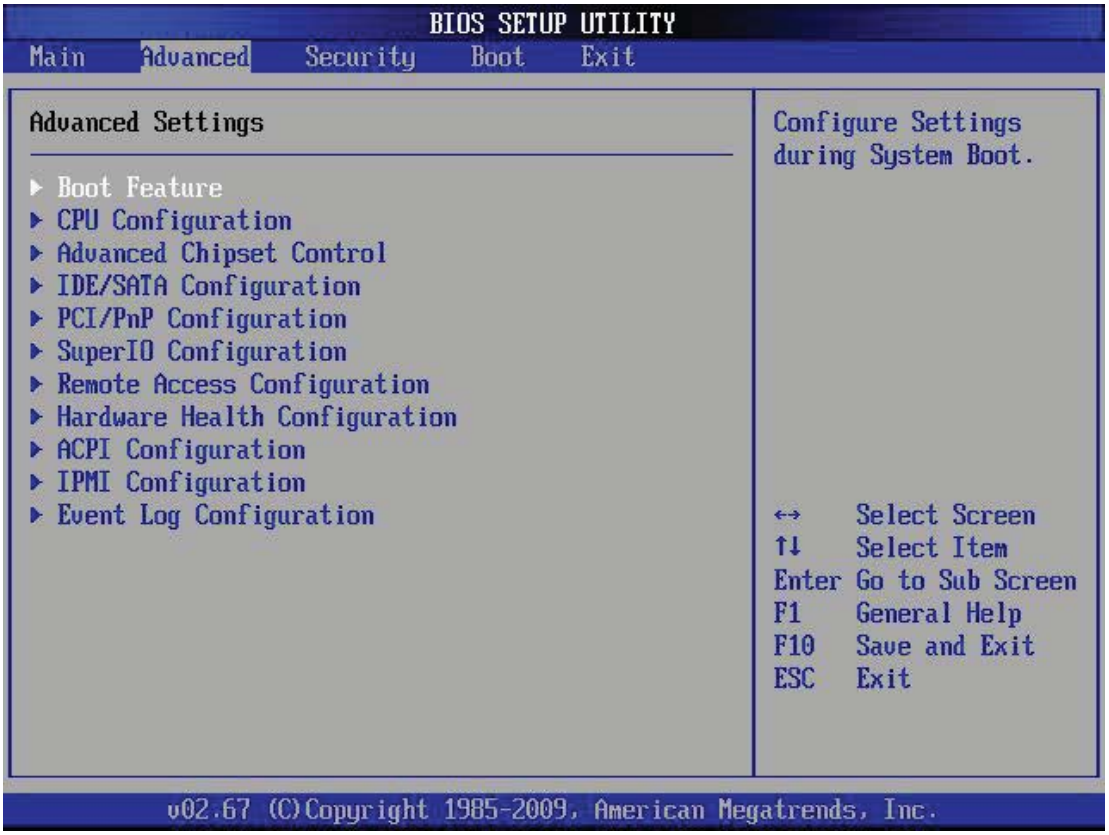
This displays the size of memory available in the system:

Populated Size

Available Size

## 7-3 Advanced Setup Configurations

Use the arrow keys to select Boot Setup and hit <Enter> to access the submenu items:




### ▶BOOT Feature

#### Quick Boot

If Enabled, this option will skip certain tests during POST to reduce the time needed for system boot. The options are **Enabled** and Disabled.

#### Quiet Boot

This option allows the bootup screen options to be modified between POST messages or the OEM logo. Select Disabled to display the POST messages. Select Enabled to display the OEM logo instead of the normal POST messages. The options are **Enabled** and Disabled.

#### AddOn ROM Display Mode

This sets the display mode for Option ROM. The options are **Force BIOS** and Keep Current.

**Bootup Num-Lock**

This feature selects the Power-on state for Numlock key. The options are Off and **On**.

**PS/2 Mouse Support**

This feature enables support for the PS/2 mouse. The options are Disabled, Enabled and **Auto.**

**Wait For 'F1' If Error**

This forces the system to wait until the 'F1' key is pressed if an error occurs. The options are Disabled and **Enabled**.

**Hit 'Del' Message Display**

This feature displays "Press DEL to run Setup" during POST. The options are **Enabled** and Disabled.

**Watch Dog Function**

If enabled, the Watch Dog Timer will allow the system to reboot when it is inactive for more than 5 minutes. The options are Enabled and **Disabled.**

**Power Button Function**

This setting allows you to decide if the power button will turn off the system instantly or wait for 4 seconds when it is pressed. The options are **Instant Off** and 4 Seconds Override.

**Restore on AC Power Loss**

Use this feature to set the power state after a power outage. Select Power-Off for the system power to remain off after a power loss. Select Power-On for the system power to be turned on after a power loss. Select Last State to allow the system to resume its last state before a power loss. The options are Power-On, Power-Off and **Last State**.

**Interrupt 19 Capture**

Interrupt 19 is the software interrupt that handles the boot disk function. When this item is set to Enabled, the ROM BIOS of the host adaptors will "capture" Interrupt 19 at boot and allow the drives that are attached to these host adaptors to function as bootable disks. If this item is set to Disabled, the ROM BIOS of the host adaptors will not capture Interrupt 19, and the drives attached to these adaptors will not function as bootable devices. The options are **Enabled** and Disabled.

### Standby Power in S5

This feature supplies standby power while in S5 (sleep mode). Set this feature to Disabled to comply with EuP requirements, Enable this feature to activate wake-up capability while in sleep mode. The options are **Enabled** and Disabled.

## ▶CPU Configuration

**Warning**: Take Caution when changing the Advanced settings. An incorrect value, a very high DRAM frequency or incorrect DRAM timing may cause system to become unstable. When this occurs, revert to the default setting.

### Clock Spread Spectrum

Select Enable to use the feature of Clock Spectrum, which will allow the BIOS to monitor and attempt to reduce the level of Electromagnetic Interference caused by the components whenever needed. Select Disabled to enhance system stability. The options are **Disabled** and Enabled.

### Max CPUID Value Limit

This feature allows the user to set the maximum CPU ID value. Enable this function to boot the legacy operating systems that cannot support processors with extended CPUID functions. The options are Enabled and **Disabled** (for the Windows OS.).

### Execute-Disable Bit Capability (Available when supported by the OS and the CPU)

Set to Enabled to enable the Execute Disable Bit which will allow the processor to designate areas in the system memory where an application code can execute and where it cannot, thus preventing a worm or a virus from flooding illegal codes to overwhelm the processor or damage the system during an attack. The default is **Enabled**. (Refer to Intel and Microsoft Web Sites for more information.)

### Hyper-threading Technology

This setting allows you to **Enable** or Disable hyper-threading in the CPU. Enabling hyper-threading results in increased CPU performance.

## ▶Advanced Chipset Control

The items included in the Advanced Settings submenu are listed below.

### ▶Northbridge Configuration

#### DRAM Frequency

This option allows the user to select the desired frequency setting for the onboard memory modules. The options are **Auto**, 667 MHz and 800 MHz.

#### Configure DRAM Timing by SPD

This option allows the user to select the desired DRAM timing for the onboard memory modules. The options are **Enabled** and Disabled. The following will appear when Disabled is selected:

##### DRAM CAS# Latency

The options are [3], [4], **[5]**, and [6]

##### DRAM RAS# to CAS# Delay

The options are 3 DRAM Clocks, 4 DRAM Clocks, 5 DRAM Clocks, and **6 DRAM Clocks**.

##### DRAM RAS# Precharge

The options are 3 DRAM Clocks, 4 DRAM Clocks, 5 DRAM Clocks, and **6 DRAM Clocks**.

##### DRAM RAS# Activate to Precharge

The options are 9 DRAM Clocks, 10 DRAM Clocks, 11 DRAM Clocks, 12 DRAM Clocks**,** 13 DRAM Clocks, 14 DRAM Clocks, and **15 DRAM Clocks.**

#### Initiate Graphics Adapter

This option selects which graphics adapter to use as a primary boot device. The options are Other, **Onboard VGA** and Slot6.

#### Internal Graphics Mode Select

This option selects the amount of system memory used by the onboard graphics adapter. The options are **Enabled, 8MB**.

**Active State Power Management**

Select Enabled to start Active-State Power Management for signal transactions between L0 and L1 Links on the PCI Express Bus. This maximizes power-saving and transaction speed. The options are Enabled and **Disabled**.

**Reserved Page Route**

This feature allows the user to decide which bus to send debug information to. The options are Disabled, PCI and **LPC**.

**USB Functions**

This feature allows the user to decide the number of onboard USB ports to be enabled. The Options are: Disabled, 2 USB ports, 4 USB ports, 6 USB ports, 8 USB ports, 10 USB ports, and **12 USB ports.**

**Legacy USB Support (available if USB Functions above is Enabled)**

Select Enabled to use Legacy USB devices. If this item is set to Auto, Legacy USB support will be automatically enabled if a legacy USB device is installed on the motherboard, and vise versa. The settings are Disabled, Enabled and **Auto**.

**USB Controller**

This feature allows the user to Enable or Disable the onboard USB controller. The options are **Enabled** and Disabled. Note: This function is grayed-out if USB Functions above is set to Enabled.

## ▶IDE/SATA Configuration

When this submenu is selected, the AMI BIOS automatically detects the presence of the IDE Devices and displays the following items:

**SATA#1 Configuration**

If Compatible is selected, it sets SATA#1 to legacy compatibility mode, while selecting Enhanced sets SATA#1 to native SATA mode. The options are Disabled, Compatible, **Enhanced.**

**Configure SATA#1 as**

This feature allows the user to select the drive type for SATA#1. The options are **IDE**, RAID and AHCI.

**SATA#2 Configuration** (Available if IDE is enabled under "Configure SATA#1 as" above)

Selecting Enhanced will set SATA#2 to native SATA mode. The options are Disabled and **Enhanced**

**IDE Detect Timeout (sec)**

Use this feature to set the time-out value for the BIOS to detect the ATA, ATAPI devices installed in the system. The options are 0 (sec), 5, 10, 15, 20, 25, 30, and **35**.

**Primary IDE Master/Slave,**
**Secondary IDE Master/Slave,**
**Third IDE Master,**
**Fourth IDE Master**

These settings allow the user to set the parameters of the disc storage devices attached to the SATA ports. Press <Enter> to activate the following submenu screen for detailed options of these items. Set the correct configurations accordingly. The items included in the submenu are:

**Type**

Select the type of device connected to the system. The options are Not Installed, **Auto**, CD/DVD and ARMD.

**LBA/Large Mode**

LBA (Logical Block Addressing) is a method of addressing data on a disk drive. In the LBA mode, the maximum drive capacity is 137 GB. For drive capacities over 137 GB, your system must be equipped with a 48-bit LBA mode addressing. If not, contact your manufacturer or install an ATA/133 IDE controller card that supports 48-bit LBA mode. The options are Disabled and **Auto**.

**Block (Multi-Sector Transfer)**

Block Mode boosts the IDE drive performance by increasing the amount of data transferred. Only 512 bytes of data can be transferred per interrupt if Block Mode is not used. Block Mode allows transfers of up to 64 KB per interrupt. Select Disabled to allow data to be transferred from and to the device one sector at a time. Select Auto to allow data transfer from and to the device occur multiple sectors at a time if the device supports it. The options are **Auto** and Disabled.

**PIO Mode**

The IDE PIO (Programmable I/O) Mode programs timing cycles between the IDE drive and the programmable IDE controller. As the PIO mode increases, the cycle time decreases. The options are **Auto**, 0, 1, 2, 3, and 4.

Select Auto to allow the AMI BIOS to automatically detect the PIO mode. Use this value if the IDE disk drive support cannot be determined.

Select 0 to allow the AMI BIOS to use PIO mode 0. It has a data transfer rate of 3.3 MBs.

Select 1 to allow the AMI BIOS to use PIO mode 1. It has a data transfer rate of 5.2 MBs.

Select 2 to allow the AMI BIOS to use PIO mode 2. It has a data transfer rate of 8.3 MBs.

Select 3 to allow the AMI BIOS to use PIO mode 3. It has a data transfer rate of 11.1 MBs.

Select 4 to allow the AMI BIOS to use PIO mode 4. It has a data transfer bandwidth of 32-Bits. Select Enabled to enable 32-Bit data transfer.

**DMA Mode**

Select Auto to allow the BIOS to automatically detect IDE DMA mode when the IDE disk drive support cannot be determined.

Select SWDMA0 to allow the BIOS to use Single Word DMA mode 0. It has a data transfer rate of 2.1 MBs.

Select SWDMA1 to allow the BIOS to use Single Word DMA mode 1. It has a data transfer rate of 4.2 MBs.

Select SWDMA2 to allow the BIOS to use Single Word DMA mode 2. It has a data transfer rate of 8.3 MBs.

Select MWDMA0 to allow the BIOS to use Multi Word DMA mode 0. It has a data transfer rate of 4.2 MBs.

Select MWDMA1 to allow the BIOS to use Multi Word DMA mode 1. It has a data transfer rate of 13.3 MBs.

Select MWDMA2 to allow the BIOS to use Multi-Word DMA mode 2. It has a data transfer rate of 16.6 MBs.

Select UDMA0 to allow the BIOS to use Ultra DMA mode 0. It has a data transfer rate of 16.6 MBs. It has the same transfer rate as PIO mode 4 and Multi Word DMA mode 2.

Select UDMA1 to allow the BIOS to use Ultra DMA mode 1. It has a data transfer rate of 25 MBs.

Select UDMA2 to allow the BIOS to use Ultra DMA mode 2. It has a data transfer rate of 33.3 MBs.

Select UDMA3 to allow the BIOS to use Ultra DMA mode 3. It has a data transfer rate of 66.6 MBs.

Select UDMA4 to allow the BIOS to use Ultra DMA mode 4 . It has a data transfer rate of 100 MBs.

The options are **Auto**, SWDMAn, MWDMAn, and UDMAn.

**S.M.A.R.T. For Hard disk drives**

Self-Monitoring Analysis and Reporting Technology (SMART) can help predict impending drive failures. Select Auto to allow the AMI BIOS to automatically detect hard disk drive support. Select Disabled to prevent the AMI BIOS from using the S.M.A.R.T. Select Enabled to allow the AMI BIOS to use the S.M.A.R.T. to support hard drive disk. The options are Disabled, Enabled, and **Auto**.

**32-Bit Data Transfer**

Select Enable to enable the function of 32-bit IDE data transfer. The options are **Enabled** and Disabled.

## ▶PCI/PnP Configuration

This feature allows the user to set the PCI/PnP configurations for the following items:

**Clear NVRAM**

This feature clears the NVRAM during system boot. The options are **No** and Yes.

**Plug & Play OS**

Selecting Yes allows the OS to configure Plug & Play devices. (This is not required for system boot if your system has an OS that supports Plug & Play.) Select **No** to allow the AMI BIOS to configure all devices in the system.

**PCI Latency Timer**

This feature sets the latency Timer of each PCI device installed on a PCI bus. Select 64 to set the PCI latency to 64 PCI clock cycles. The options are 32, **64**, 96, 128, 160, 192, 224 and 248.

**PCI IDE Bus Master**

When enabled, the BIOS uses PCI bus mastering for reading/writing to IDE drives. The options are Disabled and **Enabled**.

**ROM Scan Ordering**

This item determines what kind of option ROM activates over another. The options are **Onboard First** and Add-on First.

**PCI Slot 1**

Use this feature to enable or disable PCI slot Option ROMs. The options are Disabled and **Enabled.**

**Load Onboard LAN 1 Option ROM/ Load Onboard LAN 2 Option ROM**

Select Enabled to load the onboard LAN Option ROM for the LAN port as specified. The options are Enabled and **Disabled**.

**Initiate Graphics Adapter**

Use this feature to select the graphics controller to be used as the primary boot device. The options are Other, **Onboard VGA** and Slot 6. Select Slot 6 if a graphics controller is installed in the CPU-controlled Slot 6 slot.

## ▶Super IO Device Configuration

**Serial Port1 Address/ Serial Port2 Address**

This option specifies the base I/O port address and the Interrupt Request address of Serial Port 1 and Serial Port 2. Select Disabled to prevent the serial port from accessing any system resources. When this option is set to Disabled, the serial port physically becomes unavailable. Select 3F8/IRQ4 to allow the serial port to use 3F8 as its I/O port address and IRQ 4 for the interrupt address. The options for Serial Port1 are Disabled, **3F8/IRQ4**, 2E8/IRQ3. The options for Serial Port2 are Disabled, **2F8/IRQ3**, and 2E8/IRQ3.

## ▶Remote Access Configuration

**Remote Access**

This allows the user to enable the Remote Access feature. The options are **Disabled** and Enabled.

If Remote Access is set to Enabled, the following items will display:

**Serial Port Number**

This feature allows the user decide which serial port to be used for Console Redirection. The options are **COM 1,** COM 2 and COM 3.

**Serial Port Mode**

This feature allows the user to set the serial port mode for Console Redirection. The options are **115200 8, n 1**; 57600 8, n, 1; 38400 8, n, 1; 19200 8, n, 1; and 9600 8, n, 1.

### Flow Control

This feature allows the user to set the flow control for Console Redirection. The options are **None**, Hardware, and Software.

### Redirection After BIOS POST

Select Disabled to turn off Console Redirection after Power-On Self-Test (POST). Select Always to keep Console Redirection active all the time after POST. (Note: This setting may not be supported by some operating systems.) Select Boot Loader to keep Console Redirection active during POST and Boot Loader. The options are Disabled, Boot Loader, and **Always**.

### Terminal Type

This feature allows the user to select the target terminal type for Console Redirection. The options are ANSI, **VT100**, and VT-UTF8.

### VT-UTF8 Combo Key Support

A terminal keyboard definition that provides a way to send commands from a remote console. Available options are **Enabled** and Disabled.

### Sredir Memory Display Delay

This feature defines the length of time in seconds to display memory information. The options are **No Delay,** Delay 1 Sec, Delay 2 Sec, and Delay 4 Sec.

## ▶Hardware Health Configuration

This feature allows the user to monitor Hardware Health of the system and review the status of each item when displayed.

### CPU Overheat Alarm

This option allows the user to select the CPU Overheat Alarm setting which determines when the CPU OH alarm will be activated to provide warning of possible CPU overheat.

**Warning:** Any temperature that exceeds the CPU threshold temperature predefined by the CPU manufacturer may result in CPU overheat or system instability. When the CPU temperature reaches this predefined threshold, the CPU and system cooling fans will run at full speed.

The options are:

- The Early Alarm: Select this setting if you want the CPU overheat alarm (including the LED and the buzzer) to be triggered as soon as the CPU temperature reaches the CPU overheat threshold as predefined by the CPU manufacturer.

- **The Default Alarm**: Select this setting if you want the CPU overheat alarm (including the LED and the buzzer) to be triggered when the CPU temperature reaches about 5ºC above the threshold temperature as predefined by the CPU manufacturer to give the CPU and system fans additional time needed for CPU and system cooling. In both the alarms above, please take immediate action as shown below.

### CPU Temperature

The CPU Temperature feature will display the CPU temperature status as detected by the BIOS.

### System Temperature

This feature displays the absolute system temperature (i.e., 34ºC).

**Low** – This level is considered as the 'normal' operating state. The CPU temperature is well below the CPU 'Temperature Tolerance'. The motherboard fans and CPU will run normally as configured in the BIOS (Fan Speed Control).

User intervention: No action required.

**Medium** – The processor is running warmer. This is a 'precautionary' level and generally means that there may be factors contributing to this condition, but the CPU is still within its normal operating state and below the CPU 'Temperature Tolerance'. The motherboard fans and CPU will run normally as configured in the BIOS. The fans may adjust to a faster speed depending on the Fan Speed Control settings.

User intervention: No action is required. However, consider checking the CPU fans and the chassis ventilation for blockage.

**High** – The processor is running hot. This is a 'caution' level since the CPU's 'Temperature Tolerance' has been reached (or has been exceeded) and may activate an overheat alarm:

The Default Alarm – the Overheat LED and system buzzer will activate if the High condition continues for some time after it is reached. The CPU fan will run at full speed to bring the CPU temperature down. If the CPU temperature still increases even with the CPU fan running at full speed, the system buzzer will activate and the Overheat LED will turn on.

The Early Alarm – the Overheat LED and system buzzer will be activated exactly when the High level is reached. The CPU fan will run at full speed to bring the CPU temperature down.

Note: In both the alarms above, please take immediate action as shown below. See CPU Overheat Alarm to modify the above alarm settings.

User intervention: If the system buzzer and Overheat LED has activated, take action immediately by checking the system fans, chassis ventilation and room temperature to correct any problems. Note: the system may shut down if it continues for a long period to prevent damage to the CPU.

**Notes:** The CPU thermal technology that reports absolute temperatures (Celsius/Fahrenheit) has been upgraded to a more advanced feature by Intel in its newer processors. The basic concept is that each CPU is embedded by a unique temperature information that the motherboard can read. This 'Temperature Threshold' or 'Temperature Tolerance' has been assigned at the factory and is the baseline by which the motherboard takes action during different CPU temperature conditions (i.e., by increasing CPU Fan speed, triggering the Overheat Alarm, etc). Since CPUs can have different 'Temperature Tolerances', the installed CPU can now send its 'Temperature Tolerance' to the motherboard resulting in better CPU thermal management.

Supermicro has leveraged this feature by assigning a temperature status to certain thermal conditions in the processor (Low, Medium and High). This makes it easier for the user to understand the CPU's temperature status, rather than by just simply seeing a temperature reading (i.e., 25$^{o}$C).

The information provided above is for your reference only. For more information on thermal management, please refer to Intel's Web site at www.Intel.com.

**CPUFAN / SYSFAN Speed**

This feature displays the fan speed readings from fan interfaces Fan1 (CPU Fan) and Fan2 (System Fan).

### Fan Speed Control Modes

This feature allows the user to decide how the system controls the speeds of the onboard fans. The CPU temperature and the fan speed are correlative. When the CPU on-die temperature increases, the fan speed will also increase for effective system cooling. Select Full Speed to allow the onboard fans to run at full speed (of 100% Pulse Width Modulation Duty Cycle) for maximum cooling. The Full Speed setting is recommended for special system configuration or debugging. Select Performance for the onboard fans to run at 70% of the Initial PWM Cycle for better system cooling. The Performance setting is recommended for high-power-consuming and high-density systems. Select Balanced for the onboard fans to run at 50% of the Initial PWM Cycle in order to balance the needs between system cooling and power saving. The Balanced setting is recommended for regular systems with normal hardware configurations. Select Energy Saving for the onboard fans to run at 30% of the Initial PWM Cycle for best power efficiency and maximum quietness. The Options are: Full Speed (@100% of PWM Cycle), Performance (@70% of PWM Cycle), **Balanced (@50% of PWM Cycle)**, and Energy Saving (@30% of PWM Cycle).

### CPU Vcore, AVCC, 3.3Vcc, 12V, V_DIMM, 5V, -12V, 3.3Vsb, and Vbat

This feature displays the voltage readings for the described components.

## ▶ACPI Configuration

Use this feature to configure Advanced Configuration and Power Interface (ACPI) power management settings for your system.

### High Performance Event Timer

Select Enabled to activate the High Performance Event Timer (HPET) that produces periodic interrupts at a much higher frequency than a Real-time Clock (RTC) does in synchronizing multimedia streams, providing smooth playback and reducing the dependency on other timestamp calculation devices, such as an x86 RDTSC Instruction embedded in the CPU. The High Performance Event Timer is used to replace the 8254 Programmable Interval Timer. The options are **Enabled** and Disabled.

### USB Device Wakeup

Select Enable to awaken the system via a USB device when the system is in S3 or S4 sleep State. The options are Enabled and **Disabled**.

### PS/2 KB/MS WakeUp

This feature is used to awaken from Standby mode by a PS/2 mouse or PS/2 keyboard. The options are Enabled and **Disabled.**

### ACPI Aware O/S

Enable ACPI support if it is supported by the OS to control ACPI through the Operating System. Otherwise, disable this feature. The options are **Yes** and No.

### Suspend Mode

This setting allows you to configure the ACPI (Advanced Configuration and Power Interface) state for your system when it is in the Suspend mode. The options are **S1**, S3 and Auto.

### AMI OEMB Table

Set this value to allow the ACPI BIOS to add a pointer to an OEMB table in the Root System Description Table (RSDT) table. The options are **Enabled**, and Disabled.

### ACPI APIC Support

Select Enabled to include the ACPI APIC Table Pointer in the RSDT (Root System Description Table) pointer list. The options are **Enabled** and Disabled.

### APIC ACPI SCI IRQ

When this item is set to Enabled, APIC ACPI SCI IRQ is supported by the system. The options are Enabled and **Disabled**.

### Headless Mode

This feature is used to enable the system to function without a keyboard, monitor or mouse attached The options are Enabled and **Disabled**.

### ACPI Version Features

The options are ACPI v1.0, **ACPI v2.0** and ACPI v3.0. Please refer to ACPI's website for further explanation: http://www.acpi.info/

## ▶IPMI Configuration (X7SPA-HF Only)

Intelligent Platform Management Interface (IPMI) is a set of common interfaces that IT administrators can use to monitor system health and to manage the system as a whole. For more information on the IPMI specifications, please visit Intel's website at www.intel.com. **Note:** For this particular motherboard, IPMI shares the same network interface with LAN1.

### IPMI Firmware Revision

This item displays the current IPMI firmware revision.

### Status of BMC

Baseboard Management Controller (BMC) manages the interface between system management software and platform hardware. This is an informational feature which returns the status code of the BMC micro controller.

### View BMC System Event Log

This feature is used to view any BMC events. It shows the total number of entries and will allow the viewing of each event by scrolling down on an Entry Number and pressing Enter.

### Clear BMC System Event Log

This feature is used to clear the System Event Log. Caution: Any cleared information is unrecoverable. Make absolutely sure you no longer need any data stored in the log before clearing the BMC Event Log.

### Set LAN Configuration

Set this feature to configure the IPMI LAN adapter with a network address.

**Channel Number** - Enter the channel number for the SET LAN Config command. This is initially set to **[1]**. Press "+" or "-" on your keyboard to change the Channel Number.

**Channel Number Status** - This feature returns the channel status for the Channel Number selected above: "Channel Number is OK" or "Wrong Channel Number".

**IP Address Source** - This feature selects whether the IP address, Subnet Mask and Gateway Address are automatically assigned by the network's DHCP server (Dynamic Host and Configuration Protocol) or manually entered by the user (Static). If Static is selected, the IP Address, Subnet Mask and Gateway Address must be manually entered below. If DHCP is selected, the next three items will be configured automatically and will be grayed out. The options are Static and **DHCP**.

**IP Address** - Enter the IP address for this machine. This should be in decimal and in dotted quad form (i.e., 192.168.10.253). The value of each three-digit number separated by dots should not exceed 255.

**Subnet Mask** - Subnet masks tell the network which subnet this machine belongs to. The value of each three-digit number separated by dots should not exceed 255 (i.e., 255.255.255.0).

**Gateway Address** - Enter the Gateway address this machine will use (i.e., 192.168.10.1).

**MAC Address** - The BIOS will automatically enter the MAC address (also known as Hardware Address) of this machine, however it may be over-ridden. MAC addresses are 6 two-digit hexadecimal numbers (Base 16, 0 ~ 9, A, B, C, D, E, F) separated by dots. (i.e., 00.30.48.D0.D4.60)

### BMC Watch Dog Timer Action

Allows the BMC to reset or power down the system if the operating system hangs or crashes. The options are **Disabled**, Reset System, Power Down, Power Cycle.

#### BMC WatchDog TimeOut [Min:Sec]

This option appears if BMC Watch Dog Timer Action (above) is enabled. This is a timed delay in minutes or seconds, before a system power down or reset after an operating system failure is detected. The options are **[5 Min]**, [1 Min], [30 Sec], and [10 Sec].

## ▶Event Log Configuration

### View Event Log

Use this option to view the System Event Log.

### Mark all events as read

This option marks all events as read. The options are OK and Cancel.

### Clear event log

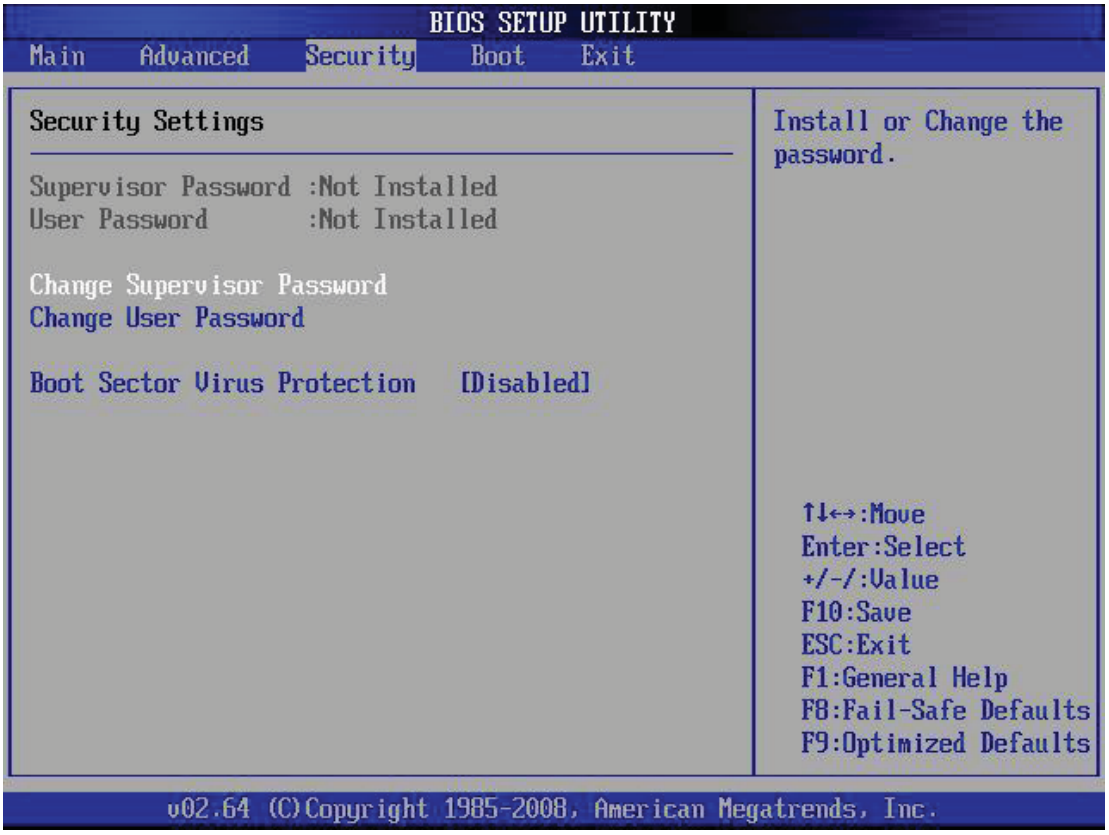
This option clears the Event Log memory of all messages. The options are OK and **Cancel.**

### PCIE Error Log

Use this option to enable logging of errors encountered in the system's PCIe bus. The options are Yes and **No.**

## 7-4 Security Settings

The AMI BIOS provides a Supervisor and a User password. If you use both passwords, the Supervisor password must be set first.




**Supervisor Password**

This item indicates if a supervisor password has been entered for the system. Clear means such a password has not been used and Set means a supervisor password has been entered for the system.

**User Password:**

This item indicates if a user password has been entered for the system. Clear means such a password has not been used and Set means a user password has been entered for the system.

**Change Supervisor Password**

Select this feature and press <Enter> to access the submenu, and then type in a new Supervisor Password.

**User Access Level** (Available when Supervisor Password is set as above)

Available options are **Full Access**: grants full User read and write access to the Setup Utility, View Only: allows access to the Setup Utility but the fields cannot be changed, Limited: allows only limited fields to be changed such as Date and Time, No Access: prevents User access to the Setup Utility.

### Change User Password

Select this feature and press <Enter> to access the submenu , and then type in a new User Password.

**Clear User Password (Available only if User Password has been set)**

**Password Check**

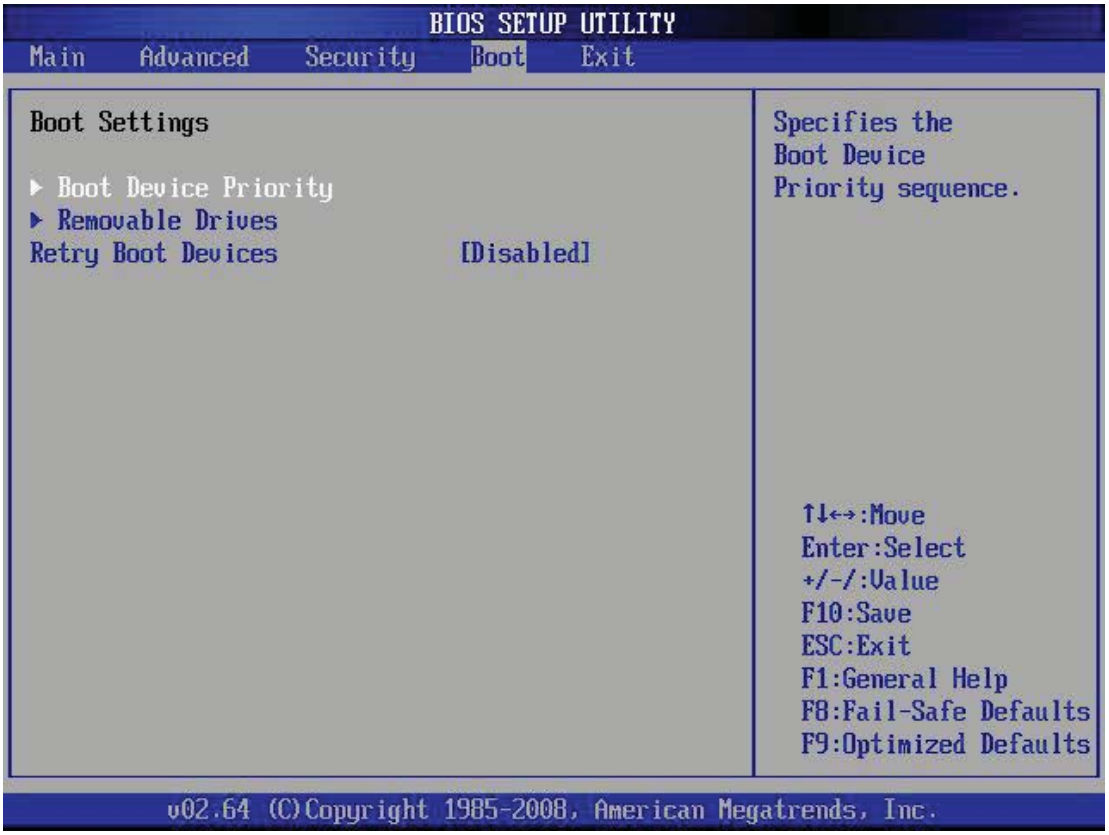
Available options are **Setup** and Always.

### Boot Sector Virus Protection

When Enabled, the AMI BOIS displays a warning when any program (or virus) issues a Disk Format command or attempts to write to the boot sector of the hard disk drive. The options are Enabled and **Disabled**.

## 7-5 Boot Settings

Use this feature to configure Boot Settings:




### ▶Boot Device Priority

This feature allows the user to specify the sequence of priority for the Boot Device. The settings are 1st boot device, 2nd boot device, 3rd boot device, 4th boot device, 5th boot device and Disabled.

- 1st Boot Device - 1st Floppy Drive
- 2nd Boot Device - [USB: XXXXXXXXX]
- 3rd Boot Device - [SATA: XXXXXXXXX]
- 4th Boot Device - [Network: XXXXXXXXX]

### ▶Hard Disk Drives

This feature allows the user to specify the sequence of priority from the available Hard Drives.

- 1st Drive [SATA: XXXXXXXXXX]
- 2nd Drive [SATA: XXXXXXXXXX]

### ▶Removable Drives

This feature allows the user to specify the boot sequence from available Removable Drives. The settings are 1st boot device, 2nd boot device, and Disabled.

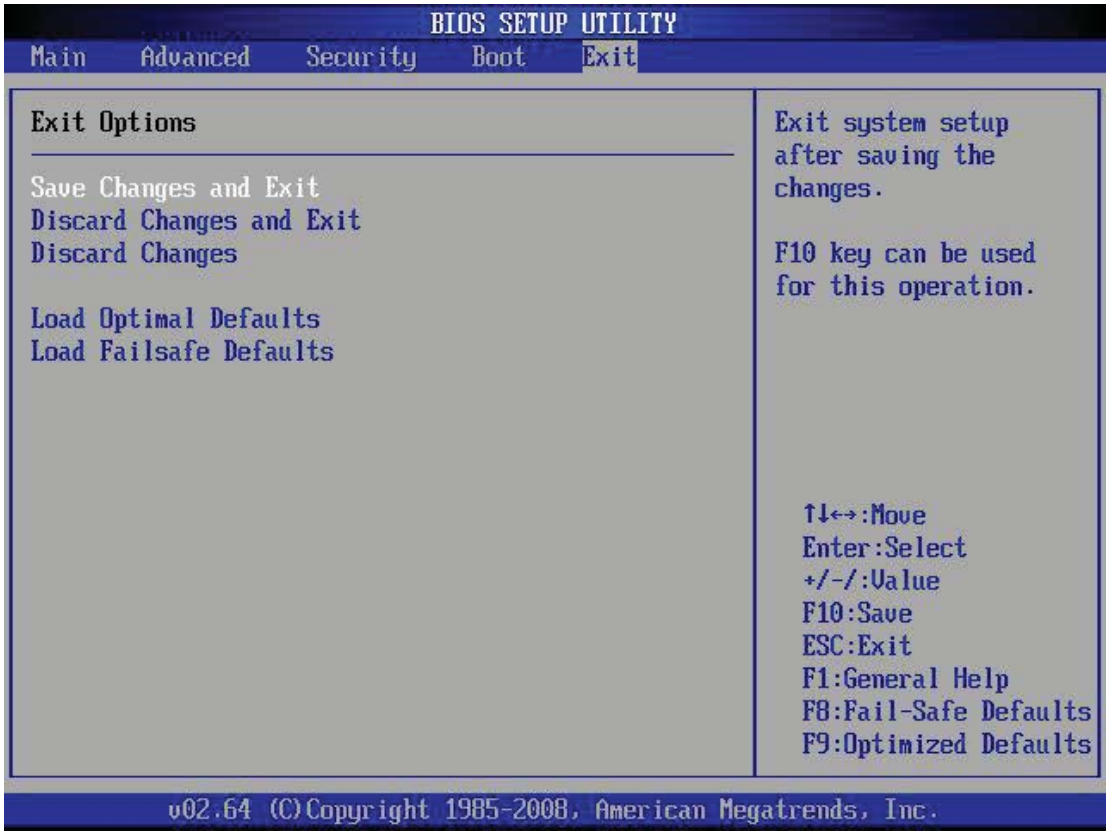
- 1st Drive
- 2nd Drive - [USB: XXXXXXXXX]

#### Retry Boot Devices

Select this option to retry booting from the configured boot devices if the systems fail to boot initially. The options are **Disabled** and Enabled.

## 7-6 Exit Options

Select the Exit tab from the AMI BIOS Setup Utility screen to enter the Exit BIOS Setup screen.




#### Save Changes and Exit

When you have completed the system configuration changes, select this option to leave the BIOS Setup Utility and reboot the computer, so the new system con-

figuration parameters can take effect. Select Save Changes and Exit from the Exit menu and press <Enter>.

**Discard Changes and Exit**

Select this option to quit the BIOS Setup without making any permanent changes to the system configuration, and reboot the computer. Select Discard Changes and Exit from the Exit menu and press <Enter>.

**Discard Changes**

Select this option and press <Enter> to discard all the changes and return to the AMI BIOS Utility Program.

**Load Optimal Defaults**

To set this feature, select Load Optimal Defaults from the Exit menu and press <Enter>. Then, select OK to allow the AMI BIOS to automatically load Optimal Defaults to the BIOS Settings. The Optimal settings are designed for maximum system performance, but may not work best for all computer applications.

**Load Fail-Safe Defaults**

To set this feature, select Load Fail-Safe Defaults from the Exit menu and press <Enter>. The Fail-Safe settings are designed for maximum system stability, but not for maximum performance.

# Appendix A

# POST Error Beep Codes

This section lists POST (Power On Self Test) error beep codes for the AMI BIOS. POST error beep codes are divided into two categories: recoverable and terminal. This section lists  Beep Codes for recoverable POST errors.

## Recoverable POST Error Beep Codes

When a recoverable type of error occurs during POST, BIOS will display a POST code that describes the problem. BIOS may also issue one of the following beep codes:

1 long and two short beeps - video configuration error

1 repetitive long beep - no memory detected

1 continuous beep with the front panel Overheat LED on - system overheat

8 short beeps - display memory read/write error

## Notes

# Appendix B

# System Specifications

### Processors
Embedded single Intel® Atom™ D510 dual-core 1.6 GHz processor

### Chipset
Intel 945GC/ICH7R chipset

### BIOS
32 Mb AMI SPI Flash

### Memory Capacity
Two DIMM slots that can support up to 4 GB of unbuffered non-ECC DDR2-667 SDRAM

**Note: See the memory section in Chapter 5 for details.**

### SATA Controller
On-chip (ICH9R) 3 Gb/s Intel SATA controller

### Hard Drive Support
Up to two internal *2*.5" drives or one internal 3.5" drive

### PCI Expansion Slots
One PCI-E x4 slot

### Motherboard
X7SPA-HF (mini ITX)
Dimensions: 6.75 x 6.75 in (171.5 x 171.5 mm)

### Chassis
SC502L-200B (mini 1U Rackmount)
Dimensions (both): (WxHxD) 17.2 x 1.7 x 9.8 in. (437 x 43 x 249 mm)

### Weight
Gross Weight: 10 lbs. (4.5 kg.)

### System Input Requirements

AC Input Voltage: 100-240 VAC (auto-range)
Rated Input Current: 3A max.
Rated Input Frequency: 50 to 60 Hz

### Power Supply

Rated Output Power: 200W (Part# PWS-202-1H)
Rated Output Voltages: +3.3V (8A), +5V (8A), +12V (16A), -12V (0.5A), +5Vsb (2A)

### Operating Environment

Operating Temperature: 10º to 35º C (50º to 95º F)
Non-operating Temperature: -40º to 70º C (-40º to 158º F)
Operating Relative Humidity: 8% to 90% (non-condensing)
Non-operating Relative Humidity: 5 to 95% (non-condensing)

### Regulatory Compliance

Electromagnetic Emissions: FCC Class A, EN 55022 Class A, EN 61000-3-2/-3-3, CISPR 22 Class A

Electromagnetic Immunity: EN 55024/CISPR 24, (EN 61000-4-2, EN 61000-4-3, EN 61000-4-4, EN 61000-4-5, EN 61000-4-6, EN 61000-4-8, EN 61000-4-11)

Safety: CSA/EN/IEC/UL 60950-1 Compliant, UL or CSA Listed (USA and Canada), CE Marking (Europe)

California Best Management Practices Regulations for Perchlorate Materials: This Perchlorate warning applies only to products containing CR (Manganese Dioxide) Lithium coin cells. “Perchlorate Material-special handling may apply. See www.dtsc.ca.gov/hazardouswaste/perchlorate”

## Notes

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